FEB 4 1982

982-D-1

TD 8.2: C 85/19/v. 5

December 1980
Interim Report

DOT HS-805-825

COMPLETED
ORIGINAL

US Department
of Transportation
National Highway
Traffic Safety
Administration

Crash Protection Systems for Handicapped School and Transit Bus Occupants

Volume V–Appendices F and G

Anil V. Khadikar
Eric Will

Minicars, Inc.
55 Depot Road
Goleta, CA 93117

Contract No. DOT HS-7-01774
Contract Amount $485,592

This document is available to the U.S. public through the National Technical Information Service, Springfield, Virginia 22161

This document is disseminated under the sponsorship of the Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its contents or use thereof.

A

Technical Report Documentation Page

1. Report No.
DOT-HS-805-825

2. Government Accession No.

3. Recipient's Catalog No.

4. Title and Subtitle
Crash Protection Systems for Handicapped
School and Transit Bus Occupants
Volume V - Appendices F and G

5. Report Date
December 1980

6. Performing Organization Code

7. Author(s)
Anil V. Khadilkar and Eric Will

8. Performing Organization Report No.
IR-1074-12-80

9. Performing Organization Name and Address
Minicars, Inc.
55 Depot Road
Goleta, CA 93117

10. Work Unit No. (TRAIS)

11. Contract or Grant No.
DOT-HS-7-01774

12. Sponsoring Agency Name and Address
U.S. Department of Transportation
National Highway Traffic Safety Administration
400 Seventh Street, S.W.
Washington, DC 20590

13. Type of Report and Period Covered
Interim Report
September 1977-March 1980

14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

A series of eight school and transit buses were subjected to nine frontal fixed barrier, two rear moving barrier and three side impact tests. Each test bus carried up to seven fully instrumented dummies - one in the driver seat, two in forward facing seats, two in side facing seats, and two in wheelchairs. The wheelchairs were secured and the wheelchair-seated dummies were restrained using commercially available restraint systems. The dummy locations, wheelchair securements, passenger restraints, crash modes and impact speeds were selected on the basis of a state-of-the-art survey and accident data analysis of operational practices and experiences with school and transit buses.

The report contains the results of the state-of-the-art survey, accident data analysis and the bus crash test program. Typical deceleration crash pulses for a wide range of school bus sizes and full size transit buses are presented, as are plots of dummy trajectories and records of dummy injury measures for the selected test conditions.

The report is presented in five volumes: Volume I, Executive Summary; Volume II, Technical Report; Volume III, Appendices A, B, C and D; Volume IV, Appendix E; and Volume V, Appendices F and G.

17. Key Words
Handicapped Transportation, Accessibility, Bus Crash Tests, Wheelchair Securements, Crash Protection, Deceleration Crash Pulses, School Bus, Transit Bus, Lifts, Ramps

18. Distribution Statement
Document is available to the U.S. public through the National Technical Information Service, Springfield, Virginia 22161

19. Security Classif. (of this report)
UNCLASSIFIED

20. Security Classif. (of this page)
UNCLASSIFIED

21. No. of Pages
856

22. Price

Reproduction of completed page authorized

MICROFILMED FROM
BEST AVAILABLE COPY

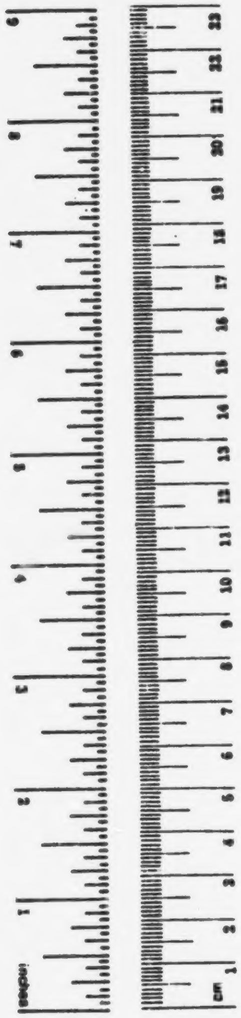
METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
		MASS (weight)		
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
		VOLUME		
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
		TEMPERATURE (exact)		
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

---

*1 in ≡ 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price $2.25, SD Catalog No. C13.10:286.



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
		AREA		
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
		MASS (weight)		
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
		VOLUME		
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
		TEMPERATURE (exact)		
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F

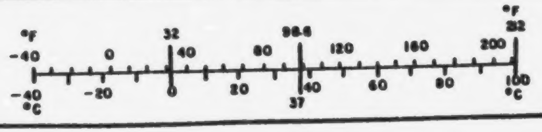


TABLE OF CONTENTS

APPENDIX	TITLE	PAGE
F	CALSPAN TEST REPORTS 6440-V-1, 6440-V-2 AND 6440-V-3...	F-1
	Report 6440-V-1 - Flxible 35 Foot Transit Bus, Front Fixed Barrier Impact Test	*
	Report 6440-V-2 - Carpenter Conventional School Bus, Front Fixed Barrier and Side Moving Barrier Impact Tests	*
	Report 6440-V-3 - GM Transit Bus, Front Fixed Barrier and Side Moving Barrier Impact Tests	*
G	CALSPAN TEST REPORTS 6440-V-4, 6440-V-5 AND 6440-V-6...	G-1
	Report 6440-V-4 - Crown Coach Bus, Front Fixed Barrier Impact Tests at 15.7 and 21.0 mph and Side Impact Test with a 5000 Pound Passenger Car at 50 mph	*
	Report 6440-V-5 - Flxible 40 Foot Transit Bus, Front Fixed Barrier Impact Test at 21.0 mph	*
	Report 6440-V-6 - Carpenter Conventional School Bus, Front Fixed Barrier Impact Test at 21.0 mph	*

---

*Each report is paginated individually, with the report number appearing at the bottom of each page.

BLANK PAGE

APPENDIX F

CALSPAN TEST REPORTS 6440-V-1, 6440-V-2 AND 6440-V-3

This appendix contains the following test reports (prepared by the Calspan Corporation):

- Report 6440-V-1 - Flxible 35 foot transit bus, front fixed barrier impact test
- Report 6440-V-2 - Carpenter conventional school bus, front fixed barrier and side moving barrier impact tests
- Report 6440-V-3 - GM transit bus, front fixed barrier and side moving barrier impact tests.

Table F-1 is a cross reference for the test buses and test reports contained in this appendix and in Appendix E (Volume IV) and Appendix G (this volume).

V

VI

TABLE F-1. CROSS REFERENCE FOR TEST BUSES AND TEST REPORTS

No.	Bus Type	Bus Description	Test Subcontractor	Test Report No.	Appendix Designation
1	Small school bus	Wayne Busette, front engine	Dynamic Science, Inc.	4936-78-105	E
2	Small school bus	Thomas Mighty Mite, front engine	Dynamic Science, Inc.	4936-78-150	E
3	Large transit bus	Flxible (35 foot overall length), rear engine	Calspan Corporation	6440-V-1	F
4	Large school bus	Carpenter conventional 66 passenger bus, front engine	Calspan Corporation	6440-V-2	F
5	Large transit bus	GM "New Look" Transit Coach (40 foot overall length), rear engine	Calspan Corporation	6440-V-3	F
6	Large school bus	Crown Coach unitized construction school bus, underfloor engine	Calspan Corporation	6440-V-4	G
7	Large transit bus	Flxible (40 foot overall length) rear engine	Calspan Corporation	6440-V-5	G
8	Large school bus	Carpenter conventional 66 passenger bus, front engine	Calspan Corporation	6440-V-6	G

CALSPAN ADVANCED TECHNOLOGY CENTER

BUS CRASH TEST PROGRAM

Donald A. Alianello

Calspan Report No. 6440-V-1

Prepared for:

MINICARS, INC.
35 LA PATERA LANE
GOLETA, CALIFORNIA 93017

PURCHASE ORDER NO. 5458
In Support of: NHTSA CONTRACT NO. DOT-HS-7-01774

TEST: TEST NO. 1 (TRANSIT BUS)
TYPE OF TEST: FRONTAL FIXED BARRIER
TEST DATE: 12-12-78

A DIVISION OF CALSPAN CORPORATION
AN ARVIN COMPANY PO BOX 400 BUFFALO NEW YORK 14225

TABLE OF CONTENTS

Page No.

LIST OF FIGURES iii

LIST OF TABLES iv

PRESENTATION OF RESULTS 1

TEST OBJECTIVE 2

TEST NO. 1 - DATA 15

LIST OF FIGURES

Figure No.		Page No.
1	VEHICLE DIMENSIONS	6
2	IMPACT AND POST-IMPACT - TEST NO. 1	7
3	PRE- AND POST-TEST NO. 1 - EXTERIOR	8
4	PRE- AND POST-TEST NO. 1 - INTERIOR	9
5	POST-TEST NO. 1 - INTERIOR	10
6	WHEELCHAIR TIE-DOWN BRACKET - TEST NO. 1	11

LIST OF TABLES

Table No.		Page No.
1	CRASH TEST SUMMARY	3
2	VEHICLE TEST WEIGHT - TEST NO. 1	4
3	POST-CRASH DATA SHEET	5
4	INSTRUMENTATION LOCATIONS	12
5	HIGH SPEED CAMERA INFORMATION - TEST NO. 1	13
6	DUMMY INJURY CRITERIA VALUES	14

X

PRESENTATION OF RESULTS

This test report presents all the test results obtained from this frontal barrier impact test which was performed on December 12, 1978 at Calspan Crash Test Facility.

Included in this document are still photographs of pre- and post-test conditions of the test vehicles and dummies. Instrumentation identification and locations for all electronic data are presented along with dummy and vehicle response data in a plotted format. High speed camera locations and camera speeds are listed in table form.

TEST OBJECTIVE

The test objective was to obtain experience and to develop techniques that could be used during the Bus Crash testing effort under Purchase Order No. 5458 from Minicars in support of Task 4 effort on DOT Contract No. - DOT-HS-7-01774, entitled "Crash Protection Systems for Handicapped School and Transit Bus Occupants".

The techniques that were examined during Test No. 1 were the lighting of the interior of the bus by using quarts lights and the on-board powering of these lights during a crash test.

The high speed photography coverage of the interior of the bus to view dummies during the impact was obtained so that the proper exposure and coverage could be determined for future tests.

TABLE 1

CRASH TEST SUMMARY

TEST NO. 1 **PROJECT** MINICARS BUS TESTS

DATE 12/12/78 **TIME** 11:20 **TEMP.** 35°F

TEST CONDITION FRONTAL PERPENDICULAR FIXED BARRIER (20 MPH)

VEHICLE NO. 1 TRANSIT BUS

	VEH. NO. 1
TEST WEIGHT (lbs)	20,350
IMPACT ANGLE (deg)*	0
IMPACT VELOCITY (mph)**	21.37
MAX. CRUSH (in)	26.37
MAX. INTRUSION (in)	--

DUMMIES	**VEH. NO. 1**
TYPE	INSTRUMENTED - HYBRID II, Part 572
LOCATION	WHEELCHAIR
RESTRAINT	LAP BELT

NUMBER OF DATA CHANNELS 15
NUMBER OF HIGH SPEED CAMERAS 6

---

*WITH RESPECT TO TOW TRACK CENTERLINE

**SPEED TRAP MEASUREMENT (±0.5% ACCURACY)

TABLE 2

VEHICLE TEST WEIGHT - TEST NO. 1

LEFT FRONT	3280 LBS	LEFT REAR	6850 LBS
RIGHT FRONT	3180 LBS	RIGHT REAR	7040 LBS
TOTAL FRONT	6460 LBS	TOTAL REAR	13890 LBS

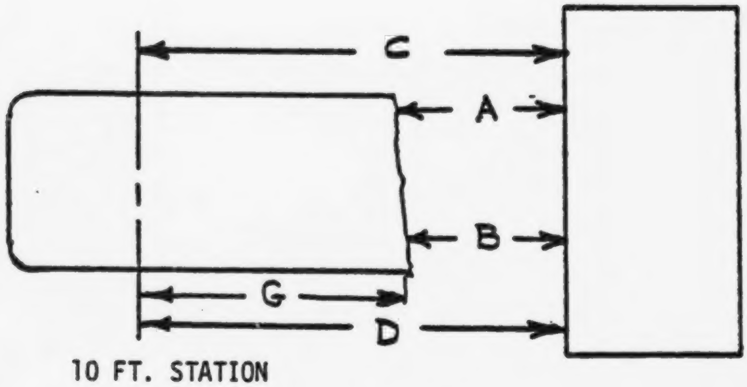
TOTAL WEIGHT = 6460 LBS + 13890 LBS = 12,350 LBS

WHEELBASE = 237 INCHES

$$Cg_{F.W.} = \frac{\text{13890 LBS 237 INCHES}}{\text{20,350 LBS}} = \text{161.7 INCHES}$$

TABLE 3

POST-CRASH DATA SHEET



10 FT. STATION

DIMENSIONS:

A =	40.25	INCHES
B =	39.50	INCHES
C =	134.25	INCHES
D =	132.75	INCHES

$$E = \frac{A + B}{2} = 39.87 \text{ INCHES (REBOUND)}$$

$$F = \frac{C + D}{2} = 133.5 \text{ INCHES}$$

$$G = F - E = 93.63 \text{ INCHES}$$

CRUSH = 10 FT. STATION - G

CRUSH = 120 - 93.63 = 26.37 INCHES

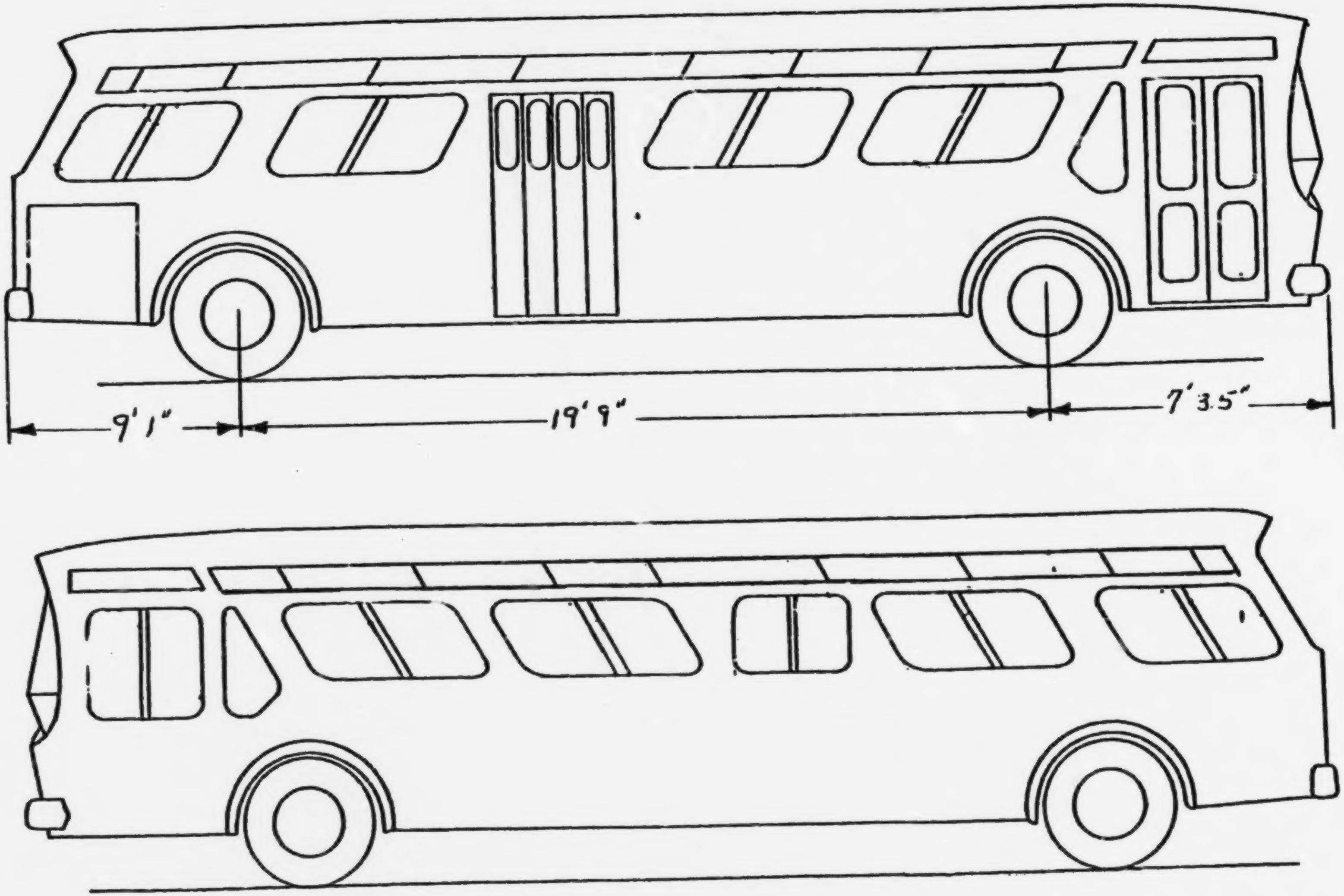


Figure 1 VEHICLE DIMENSIONS

6440 -V-1

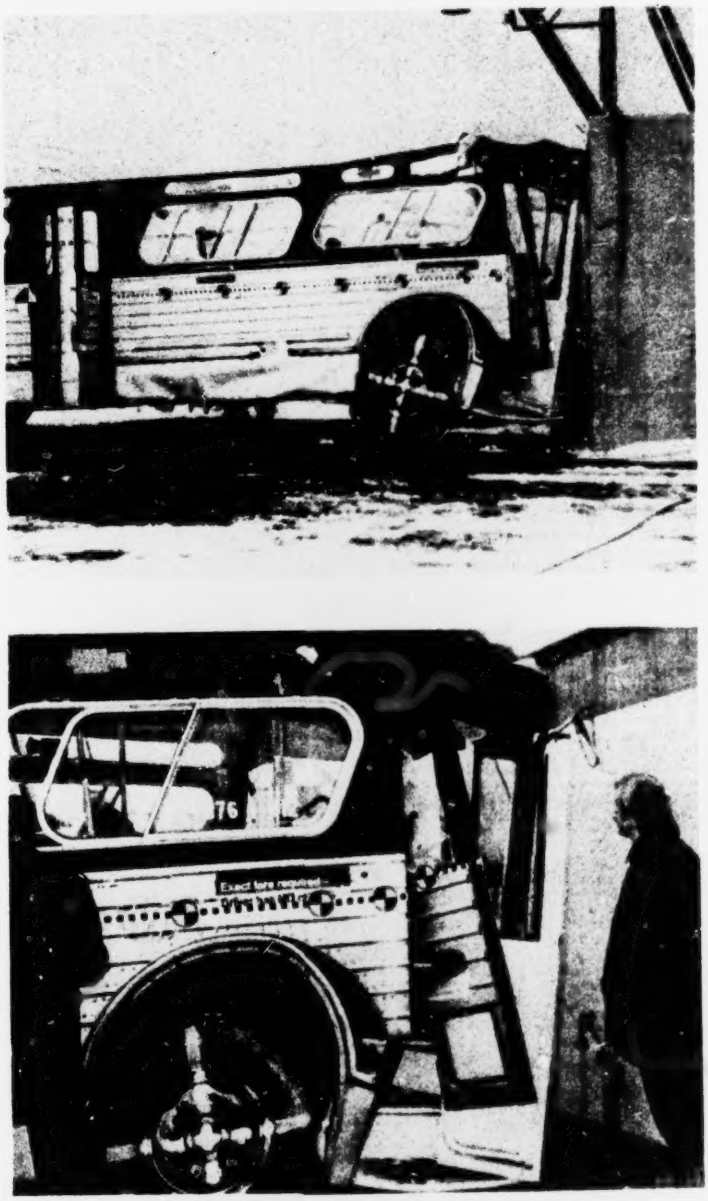

76
Exact fare required

Figure 2 IMPACT AND POST-IMPACT – TEST NO. 1

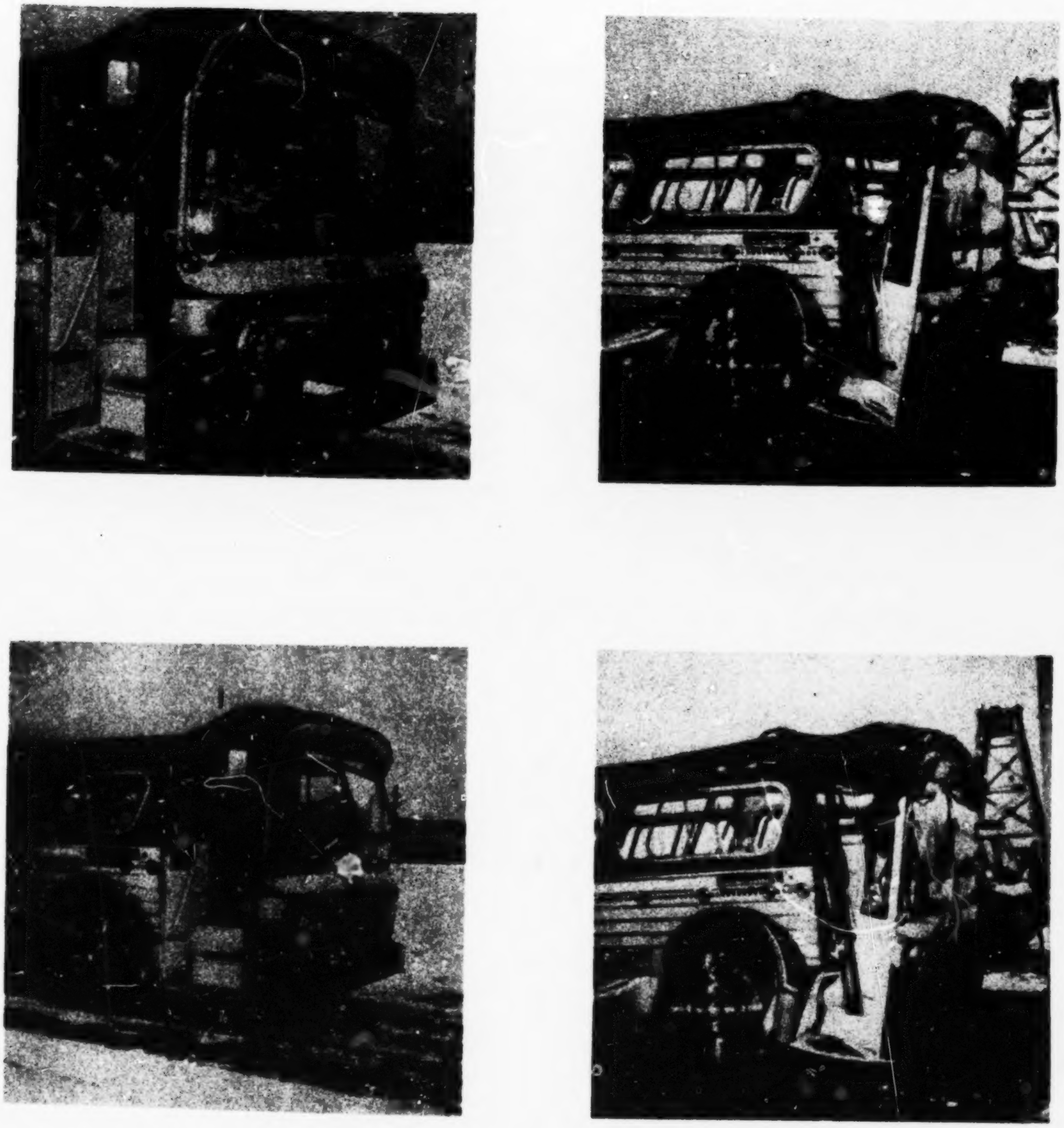


Figure 3 PRE- AND POST-TEST NO. 1 – EXTERIOR

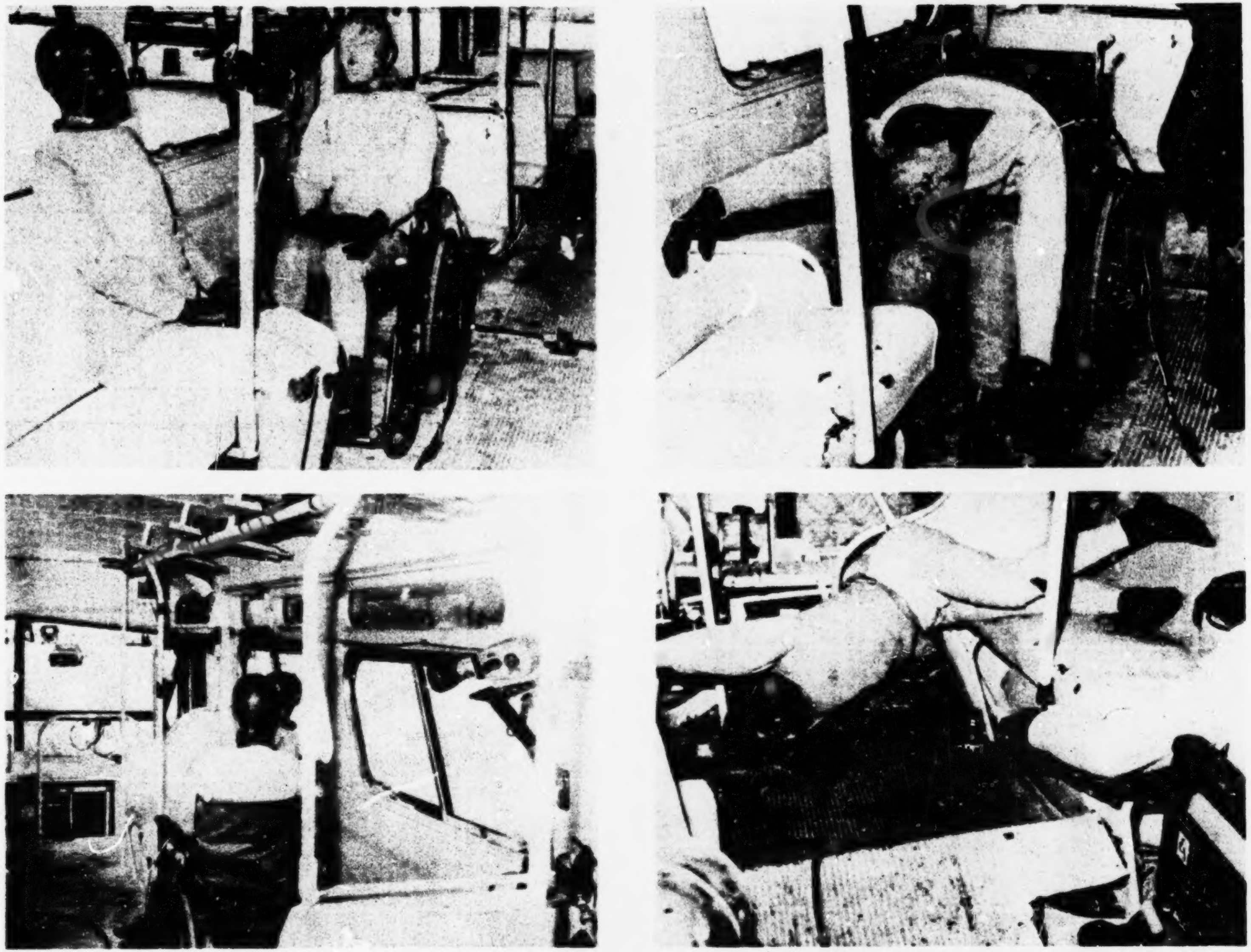


Figure 4 PRE- AND POST-TEST NO. 1 – INTERIOR

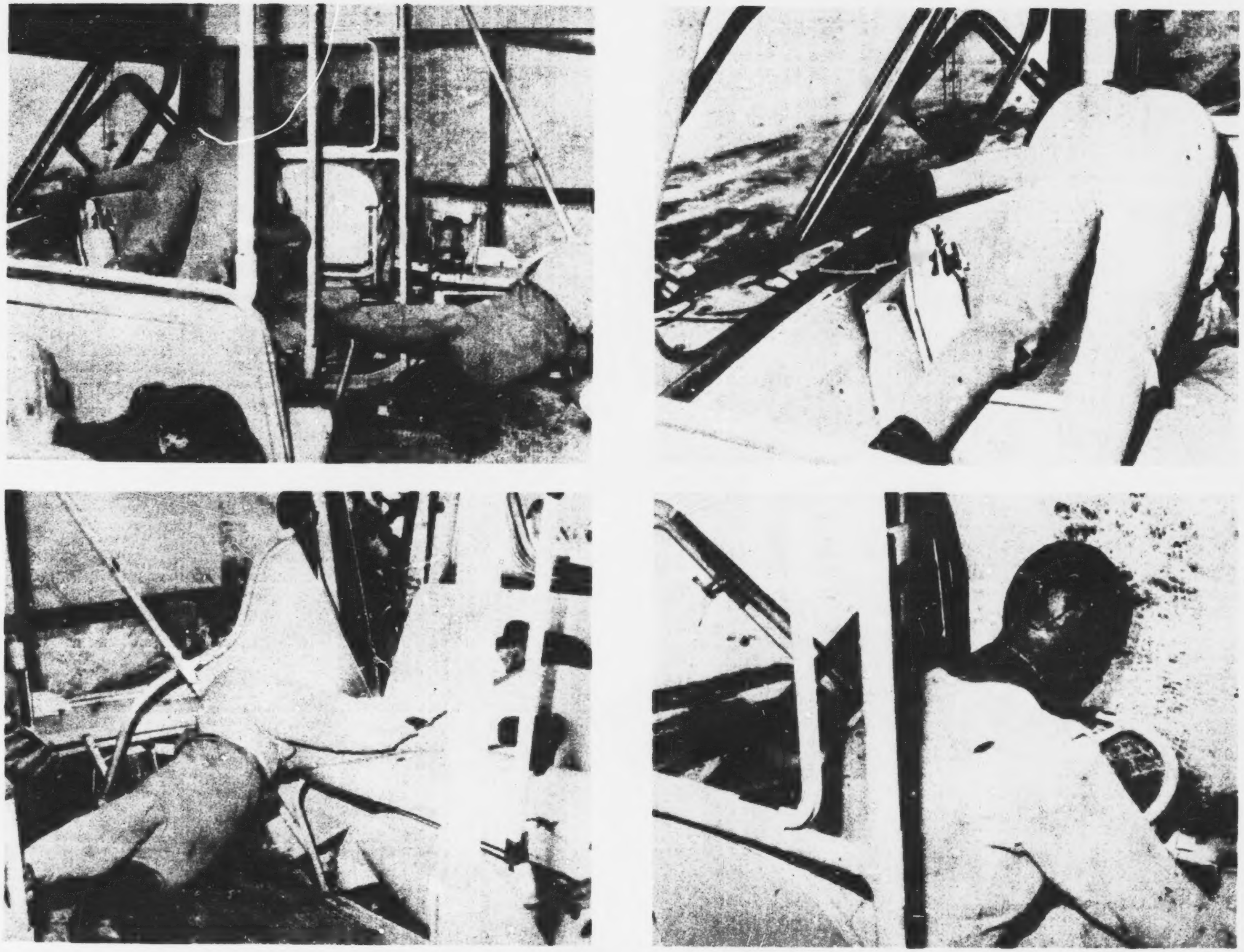


Figure 5 POST-TEST NO. 1 – INTERIOR

6440 -V-1

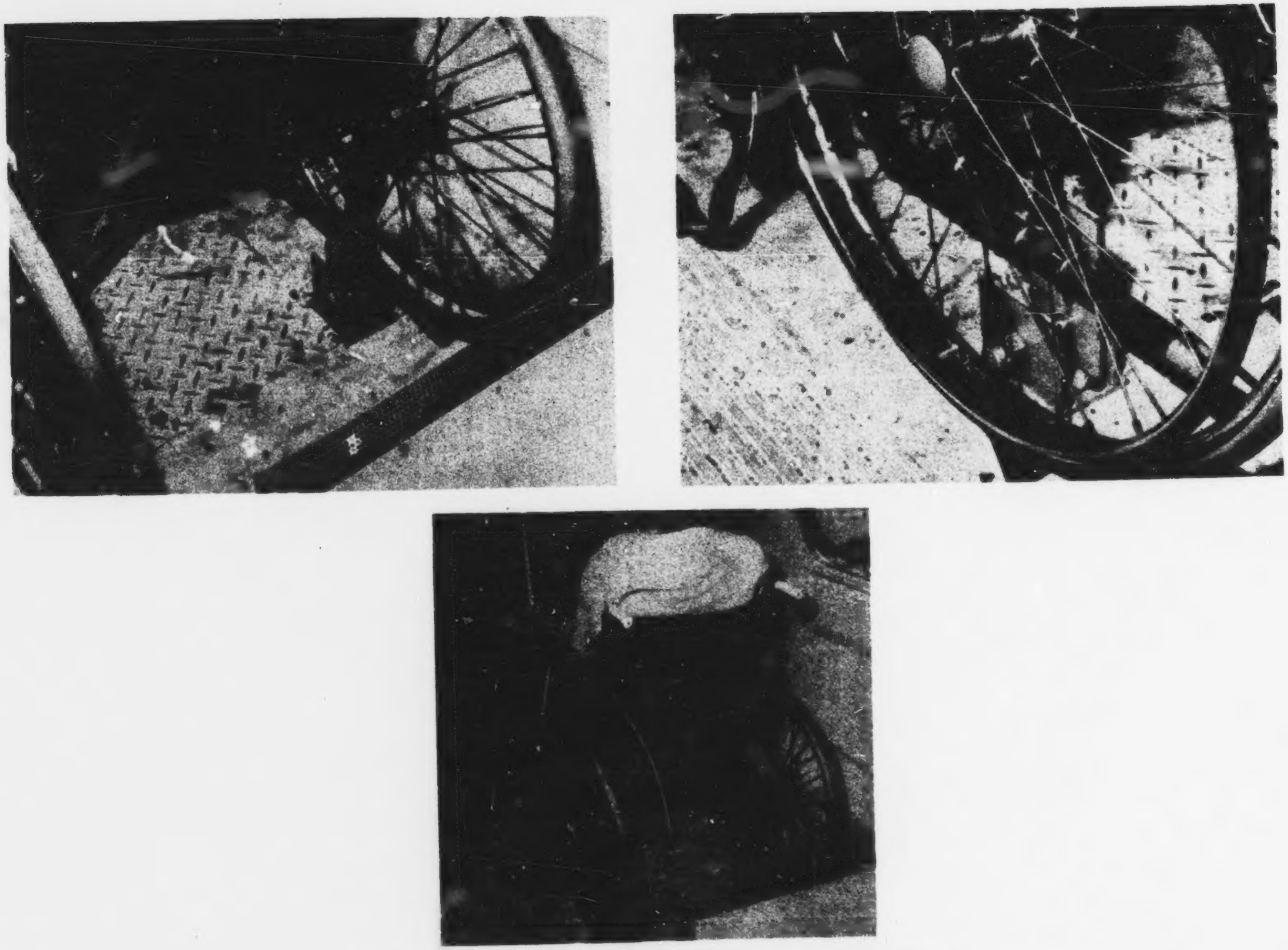


Figure 6 WHEELCHAIR TIE-DOWN BRACKET – TEST NO. 1

6440 -V-1

TABLE 4

INSTRUMENTATION LOCATIONS

ACCELEROMETER PACKAGE OVER FRONT AXLE ON CENTERLINE OF VEHICLE:

X ACCELEROMETER
Y ACCELEROMETER

ACCELEROMETER PACKAGE ON CENTERLINE OF VEHICLE AT CENTER OF VEHICLE:

X ACCELEROMETER
Y ACCELEROMETER

ACCELEROMETER PACKAGE ON CENTERLINE OF VEHICLE OVER REAR AXLE:

X ACCELEROMETER
Y ACCELEROMETER

HYBRID II, PART 572 DUMMY IN WHEELCHAIR WITH SEAT BELT:

HEAD ACCELEROMETER	(X,Y,Z)
CHEST ACCELEROMETER	(X,Y,Z)
FEMUR LOADS	(RIGHT, LEFT)

TABLE 5

HIGH SPEED CAMERA INFORMATION (TEST No. 1)

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)
1	FULL BUS - CURB SIDE	PHOTOSONIC	13 MM	300 PPS
2	1/2 BUS - CURB SIDE	PHOTOSONIC	13 MM	360 PPS
3	1/3 NORTH - DRIVER SIDE	PHOTOSONIC	13 MM	250 PPS
4	ON-BOARD REAR	STALEX	8 MM	650 PPS
5	ON-BOARD - LEFT	STALEX	8 MM	1000 PPS
6	ON-BOARD - RIGHT	STALEX	8 MM	900 PPS

NOTE: CAMERAS ARE NUMBERED ACCORDING TO SPLICING SEQUENCE OF FILM.

(24 fps) REAL TIME MOVIE FILM COVERAGE OF PRE-CRASH, POST-CRASH AND CRASH EVENT SPLICED AT START AND END OF FILM.

TABLE 6

DUMMY INJURY CRITERIA VALUES

	MAXIMUM ACCELERATION ("G") *											
	HEAD				CHEST				PELVIS			
	X	Y	Z	R	X	Y	Z	R	X	Y	Z	R
DUMMY (1)	-19	4	35	36	-7	3.7	13.8	14				
DUMMY (2)												
DUMMY (3)												
DUMMY (4)												

	MAXIMUM FORCE-FEMUR LOAD (LBS)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY (1)	-150	-150
DUMMY (2)		
DUMMY (3)		
DUMMY (4)		

	MAXIMUM FORCE-SEAT BELTS LOADS (LBS)		
	SHOULDER STRAP UPPER BELT LOAD	LAP STRAP RIGHT BELT LOAD	LAP STRAP LEFT BELT LOAD
DUMMY (1)			
DUMMY (2)			
DUMMY (3)			
DUMMY (4)			

	HEAD INJURY CRITERIA**				SEVERITY INDEX	
	HIC	t_1 (SEC)	t_2 (SEC)	AVE. ACC. (g) t_1 TO t_2	HEAD	CHEST
DUMMY (1)	374	.127	.233	26	453	52
DUMMY (2)						
DUMMY (3)						
DUMMY (4)						

*DEFINED AS EXCEEDING 0.003 SEC. DURATION

**AS DEFINED IN FMVSS NO. 208

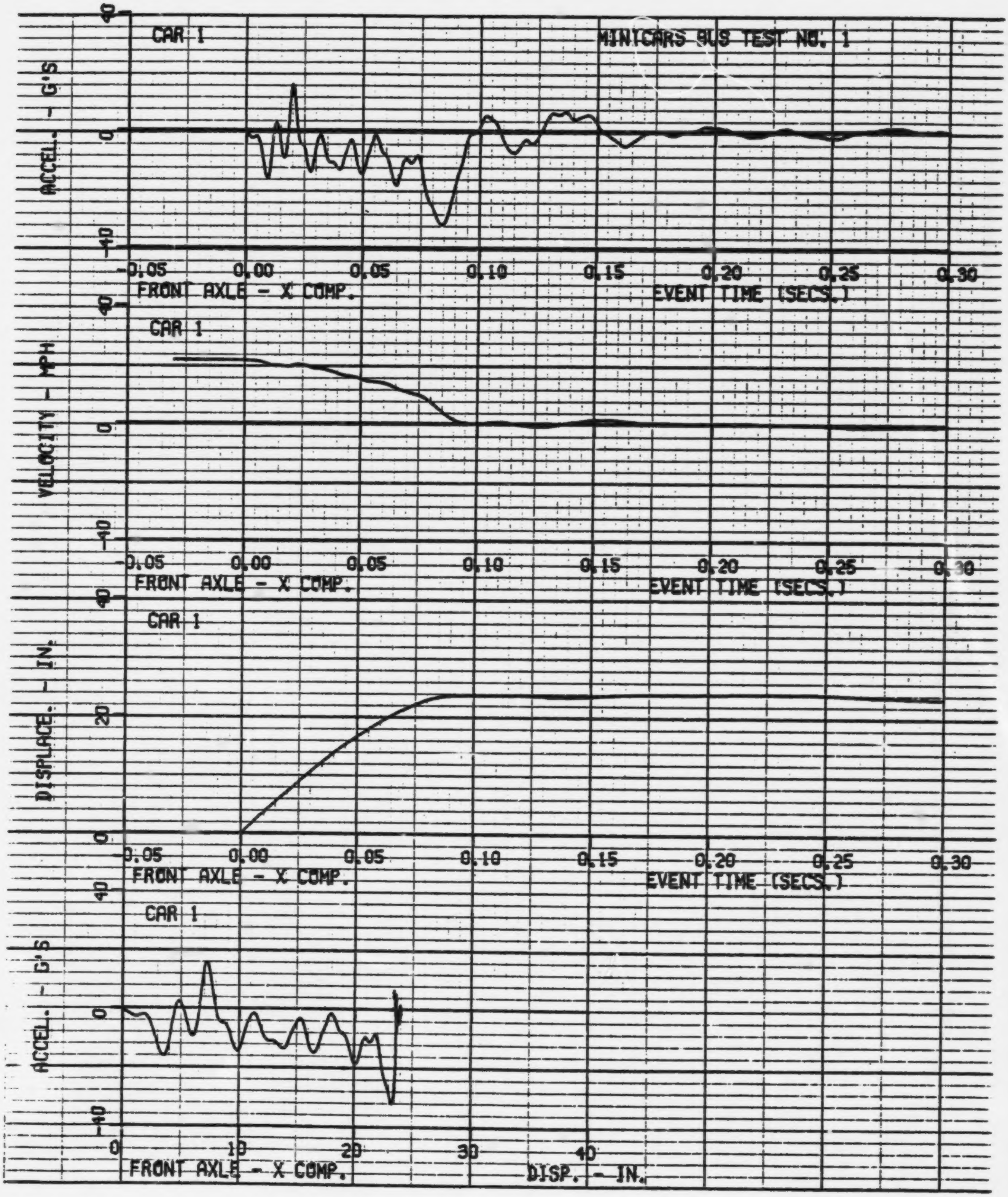
TEST NO. 1 - DATA

TRANSIT BUS

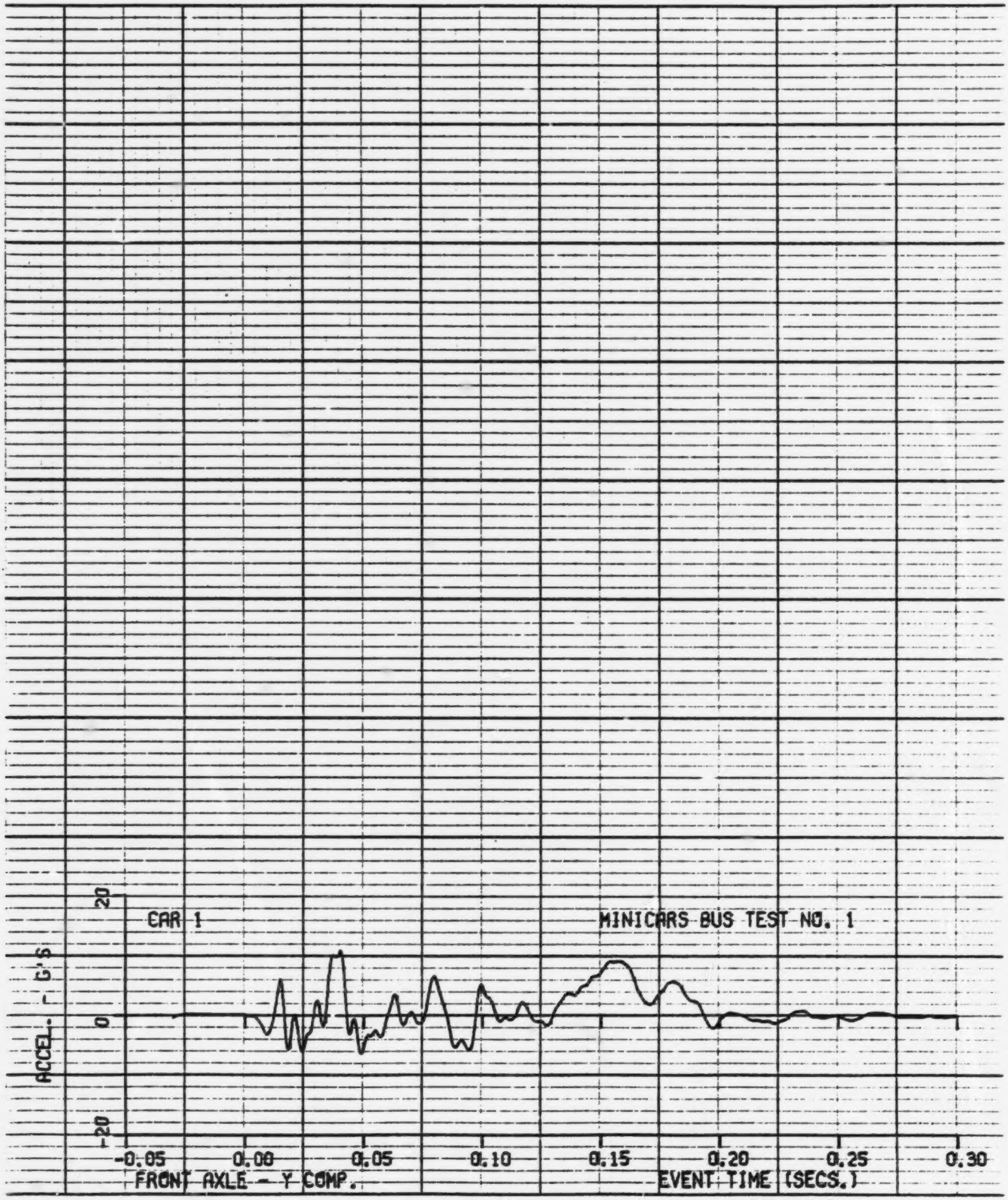
	FILTER CHANNEL CLASS
VEHICLE DATA	60
HEAD ACCELERATION	1000
CHEST ACCELERATION	180
FEMUR FORCES*	600

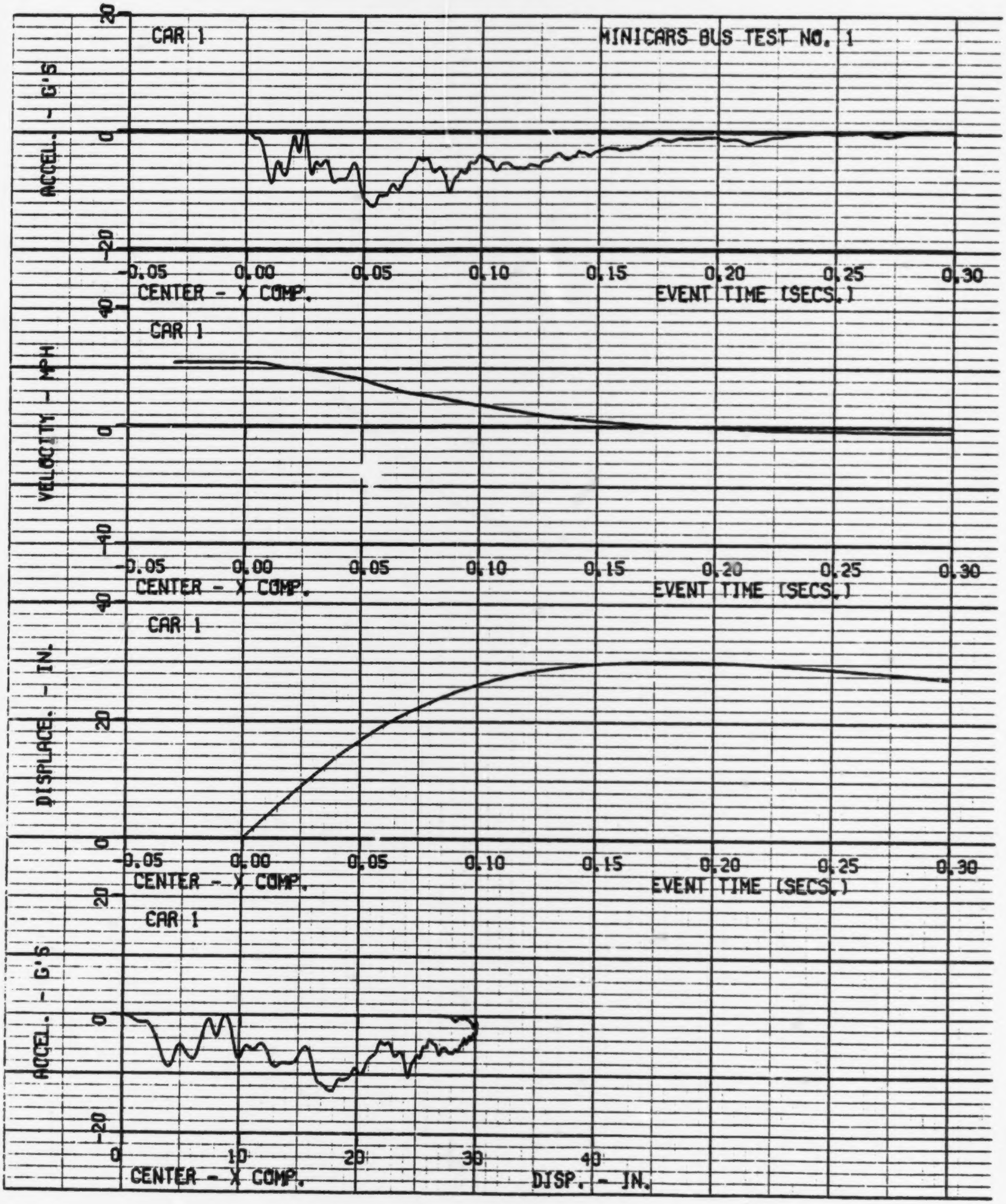
---

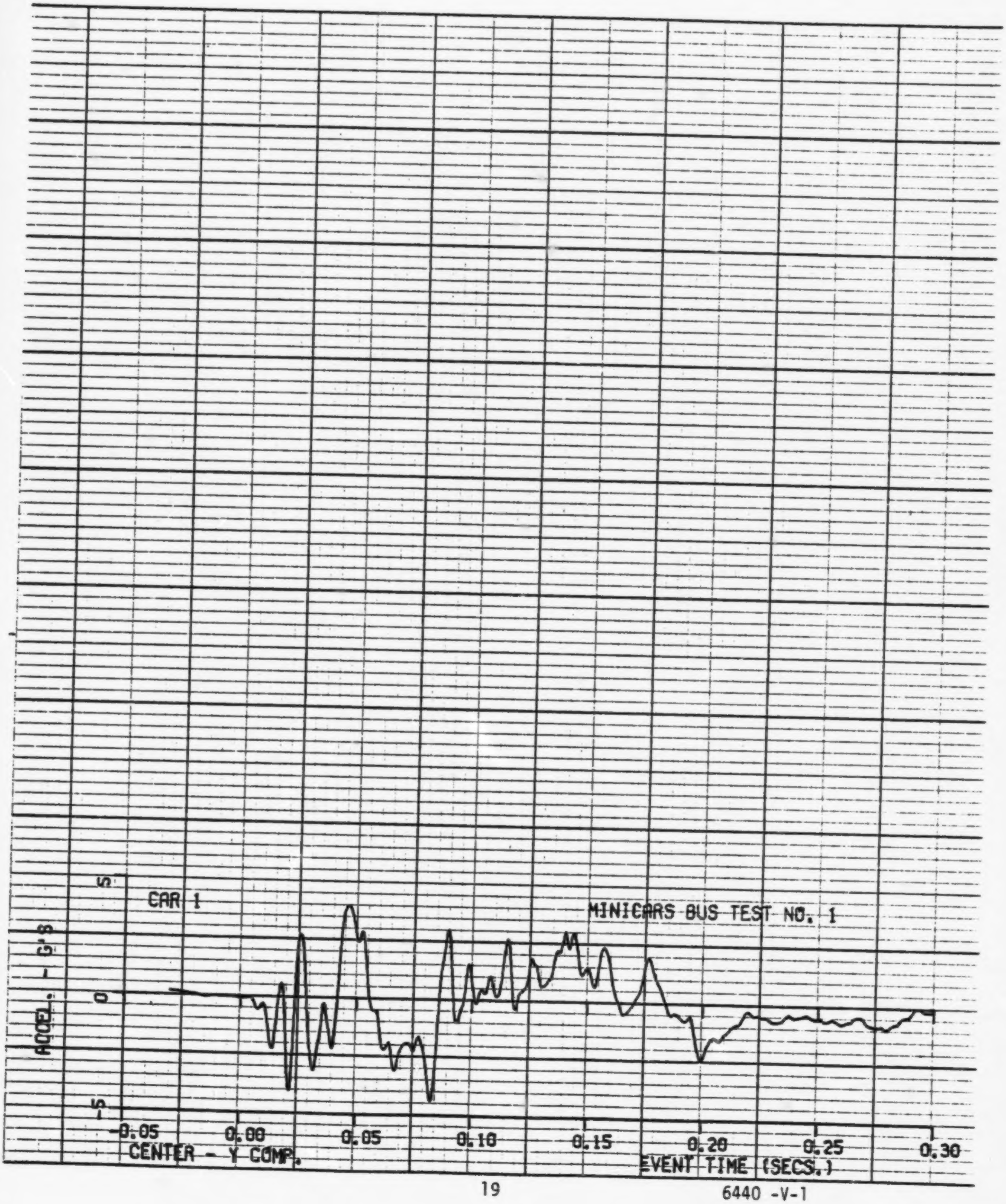
*DUMMY LEFT FEMUR FORCE DATA HAD A ZERO SHIFT IN DATA DUE TO A BAD CABLE.

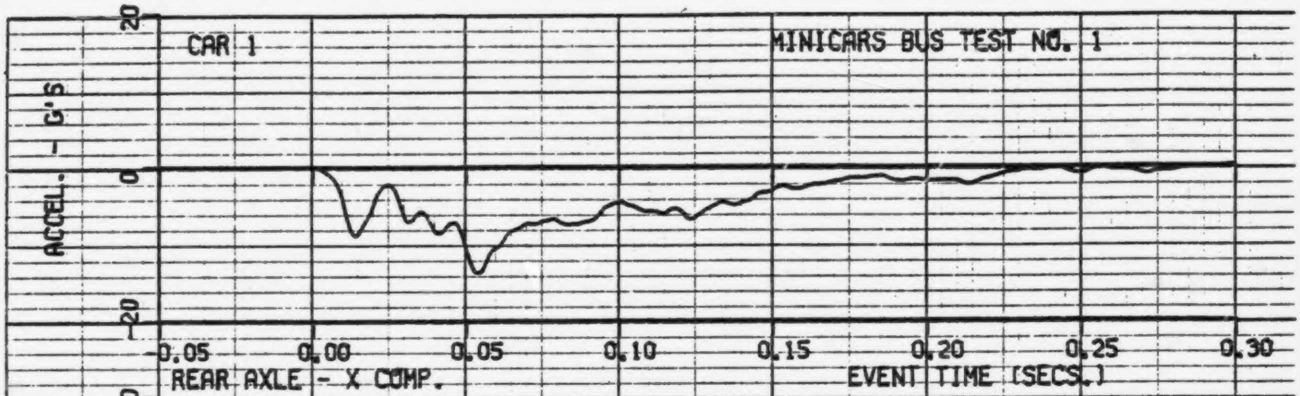


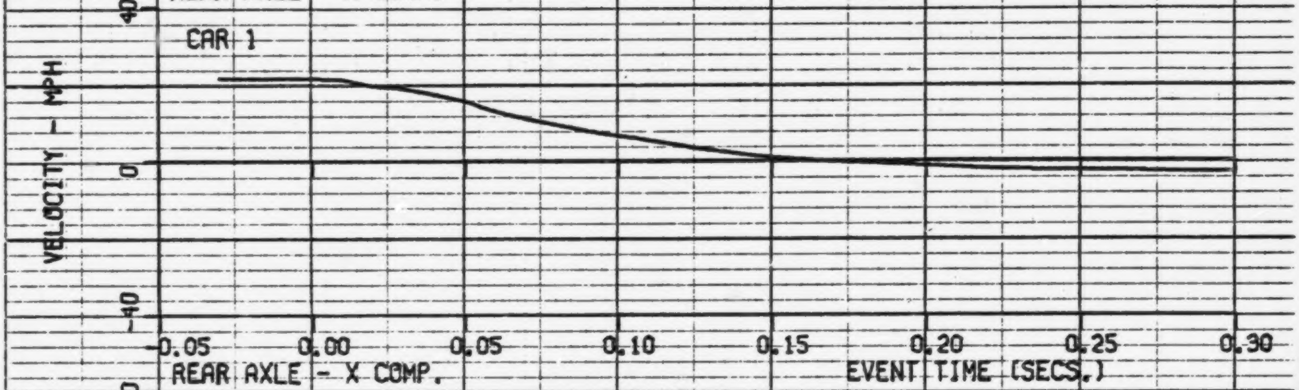
CAR 1
MINICARS BUS TEST NO. 1
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
FRONT AXLE - X COMP.
EVENT TIME (SECS.)
CAR 1
VELOCITY - MPH
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
FRONT AXLE - X COMP.
EVENT TIME (SECS.)
CAR 1
DISPLACE. - IN.
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
FRONT AXLE - X COMP.
EVENT TIME (SECS.)
CAR 1
ACCEL. - G'S
40
0
-40
0
10
20
30
40
FRONT AXLE - X COMP.
DISP. - IN.

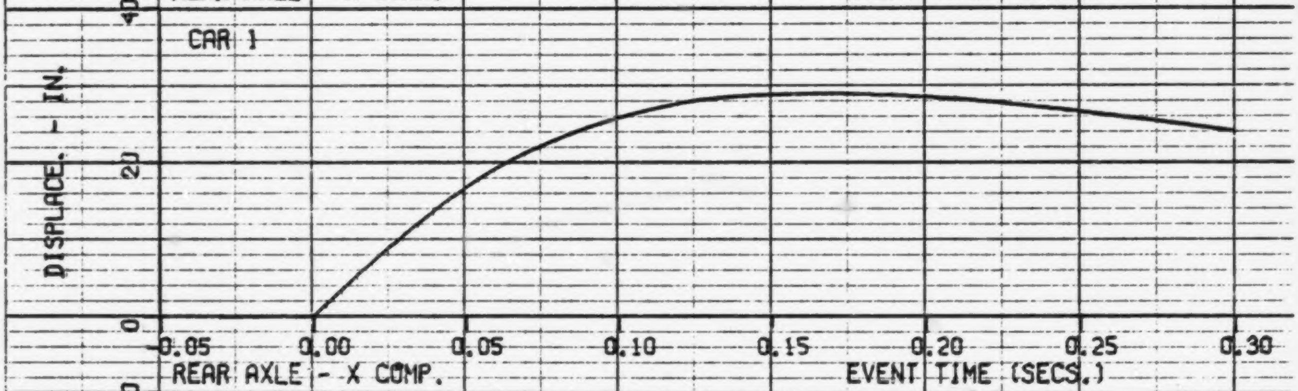

CAR 1
MINICARS BUS TEST NO. 1
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
FRONT AXLE - Y COMP.
EVENT TIME (SECS.)

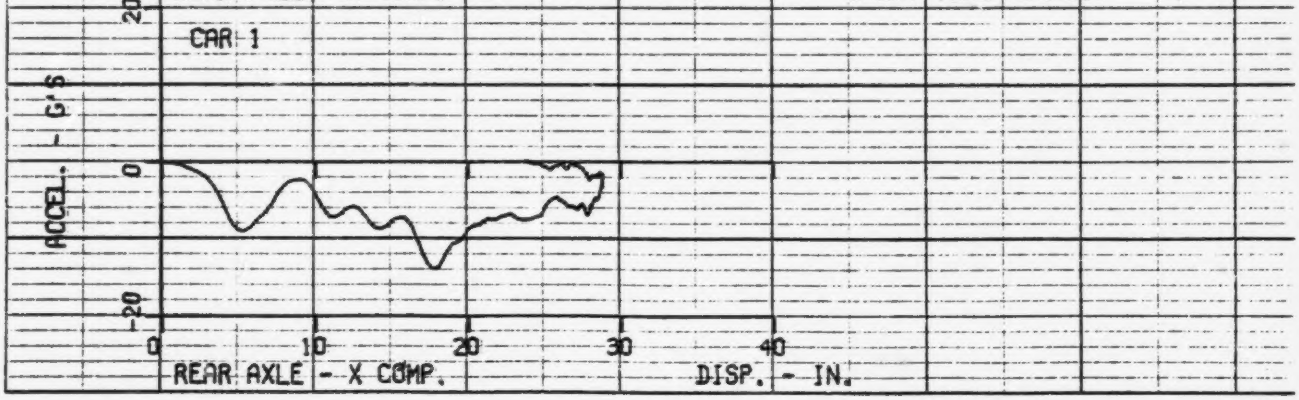

MINICARS BUS TEST NO. 1
CAR 1
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
CENTER - X COMP.
EVENT TIME (SECS.)
CAR 1
VELOCITY - MPH
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
CENTER - X COMP.
EVENT TIME (SECS.)
CAR 1
DISPLACE. - IN.
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
CENTER - X COMP.
EVENT TIME (SECS.)
CAR 1
ACCEL. - G'S
20
0
-20
0
10
20
30
40
CENTER - X COMP.
DISP. - IN.

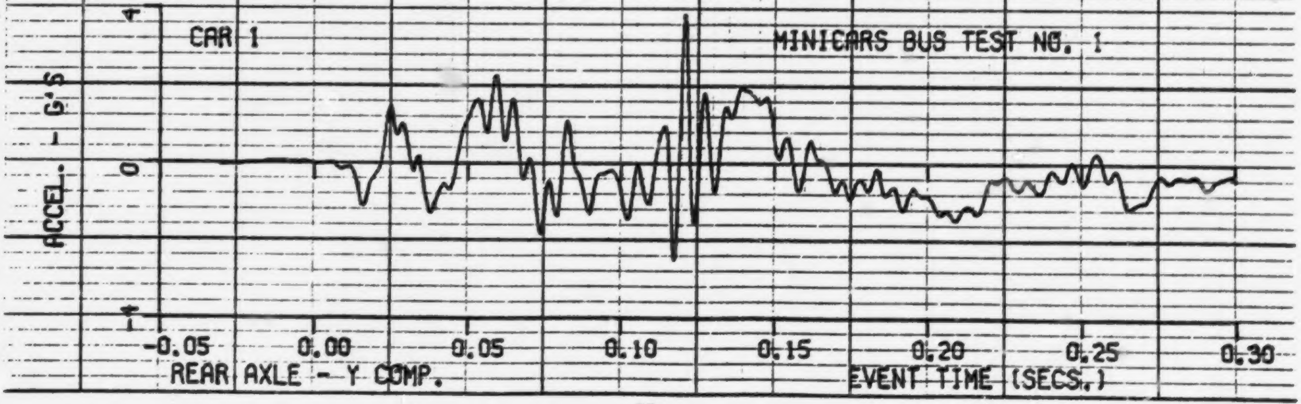

CAR 1
MINICARS BUS TEST NO. 1
ACCEL. - G'S
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
CENTER - Y COMP.
EVENT TIME (SECS.)

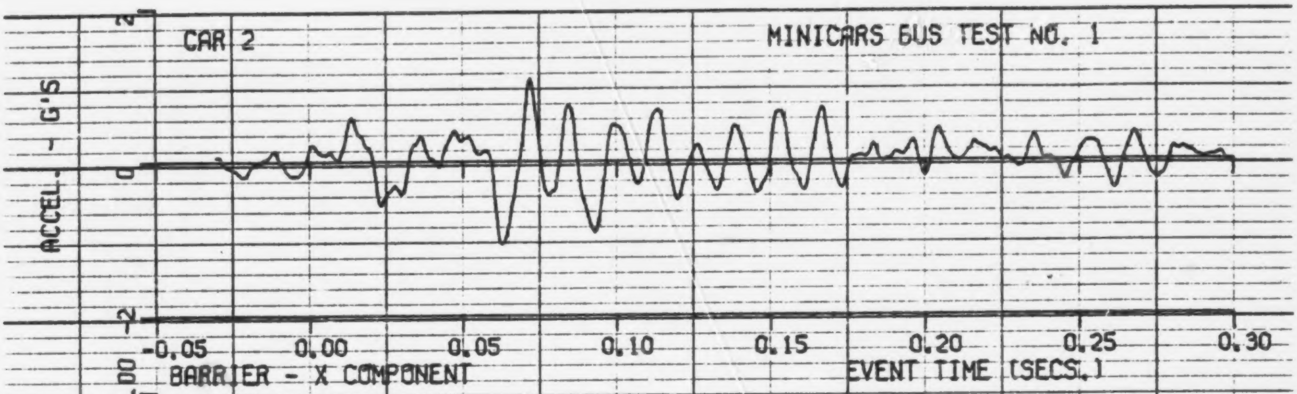

CAR 1
MINICARS BUS TEST NO. 1
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
REAR AXLE - X COMP.
EVENT TIME (SECS.)

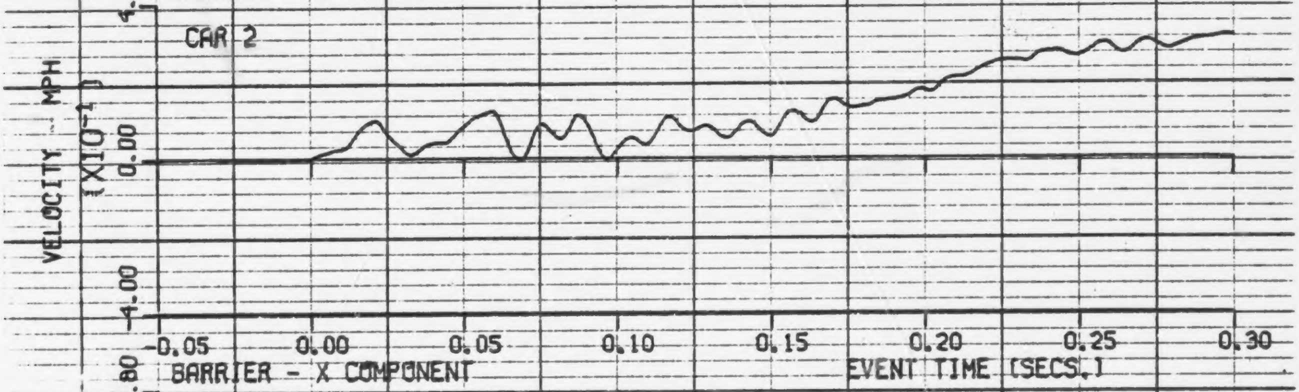

CAR 1
VELOCITY - MPH
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
REAR AXLE - X COMP.
EVENT TIME (SECS.)

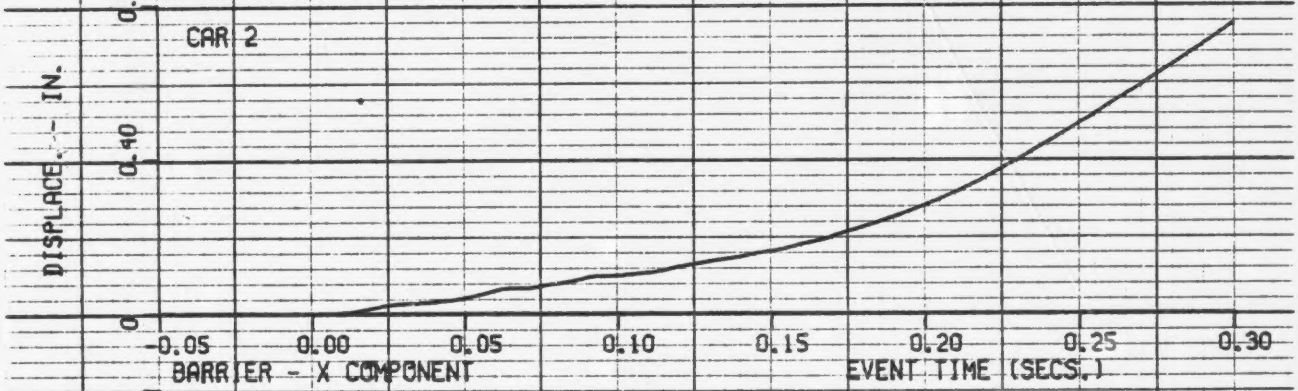

CAR 1
DISPLACE. - IN.
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
REAR AXLE - X COMP.
EVENT TIME (SECS.)

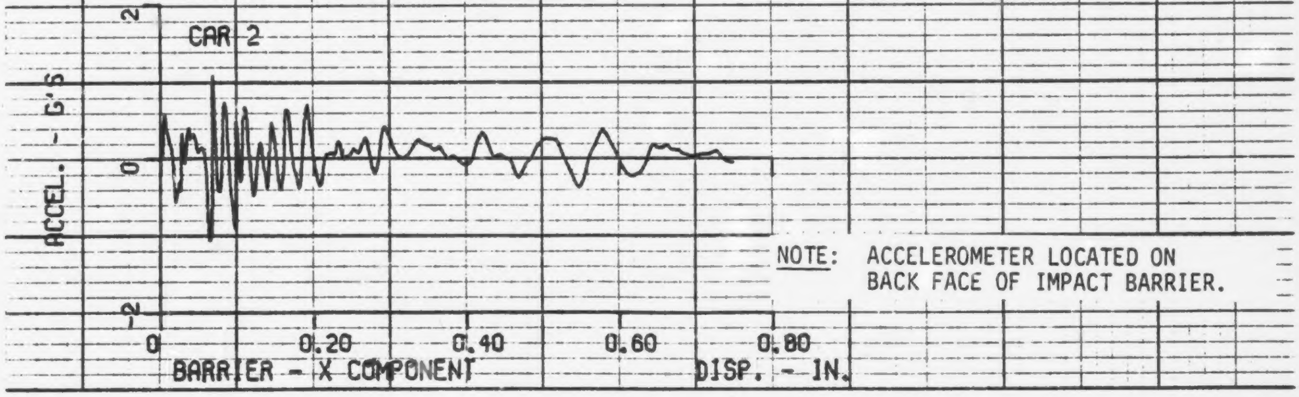

CAR 1
ACCEL. - G'S
20
0
-20
0
10
20
30
40
REAR AXLE - X COMP.
DISP. - IN.


CAR 1
MINICARS BUS TEST NO. 1
ACCEL. - G'S
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
REAR AXLE - Y COMP.
EVENT TIME (SECS.)

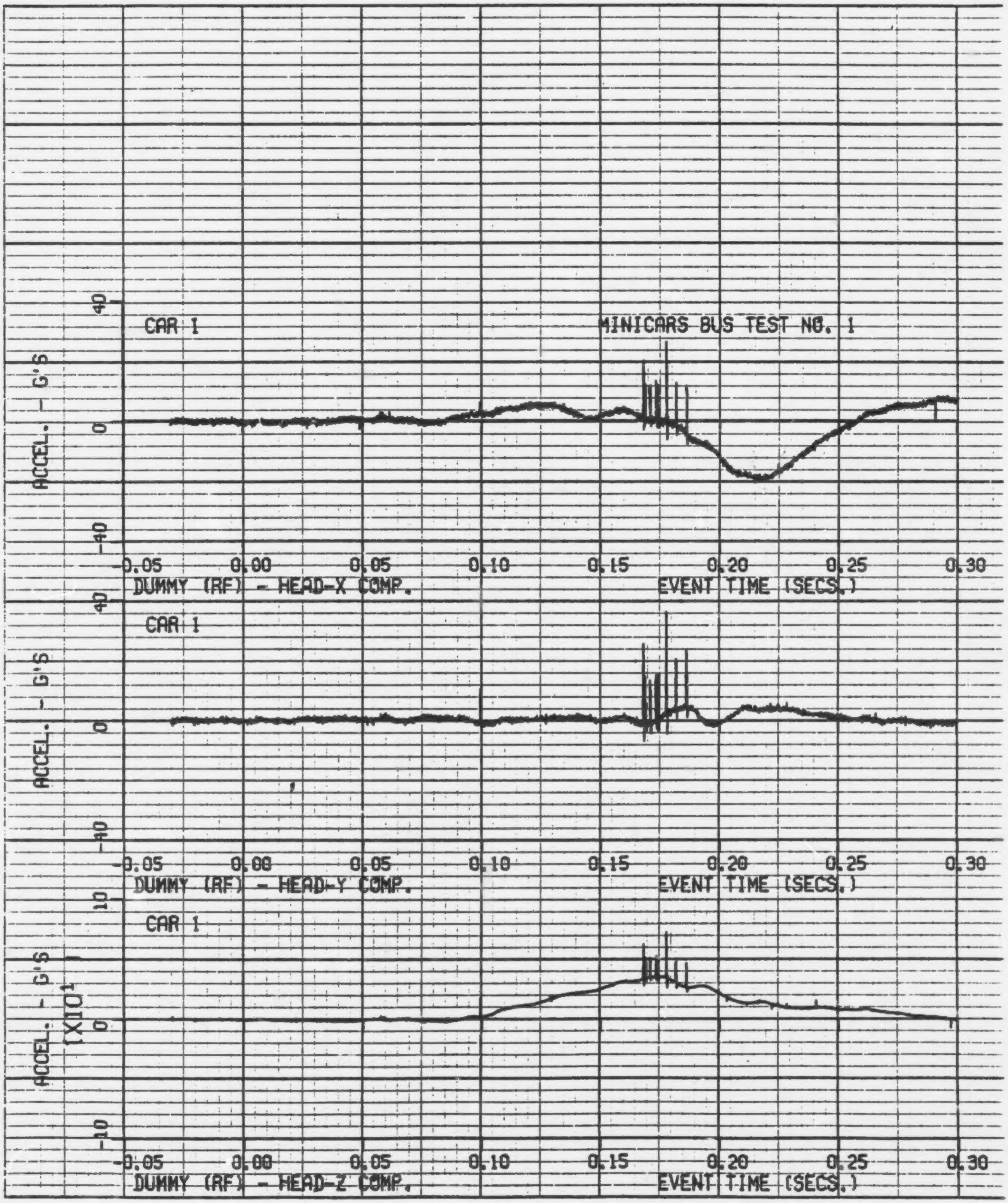


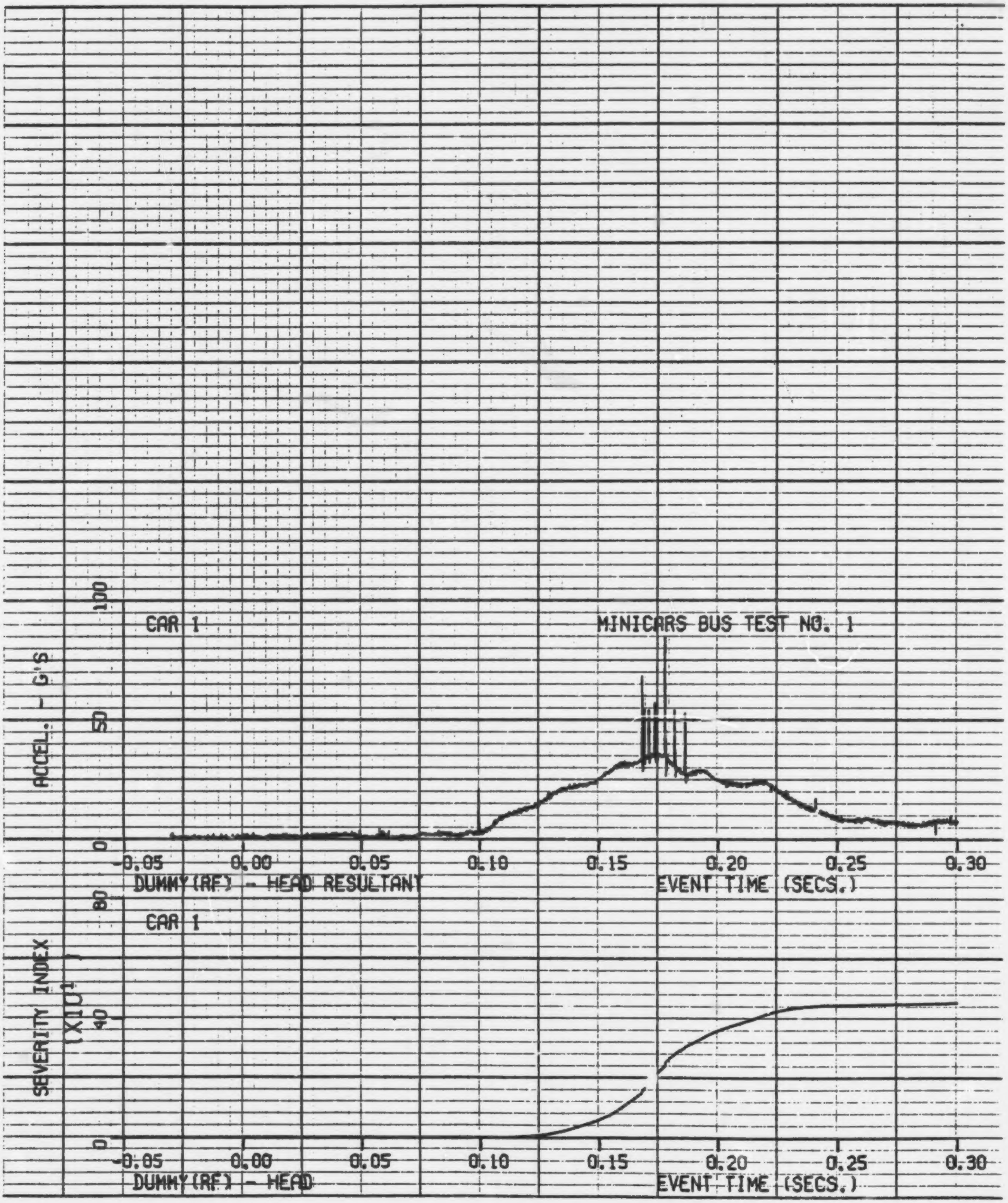


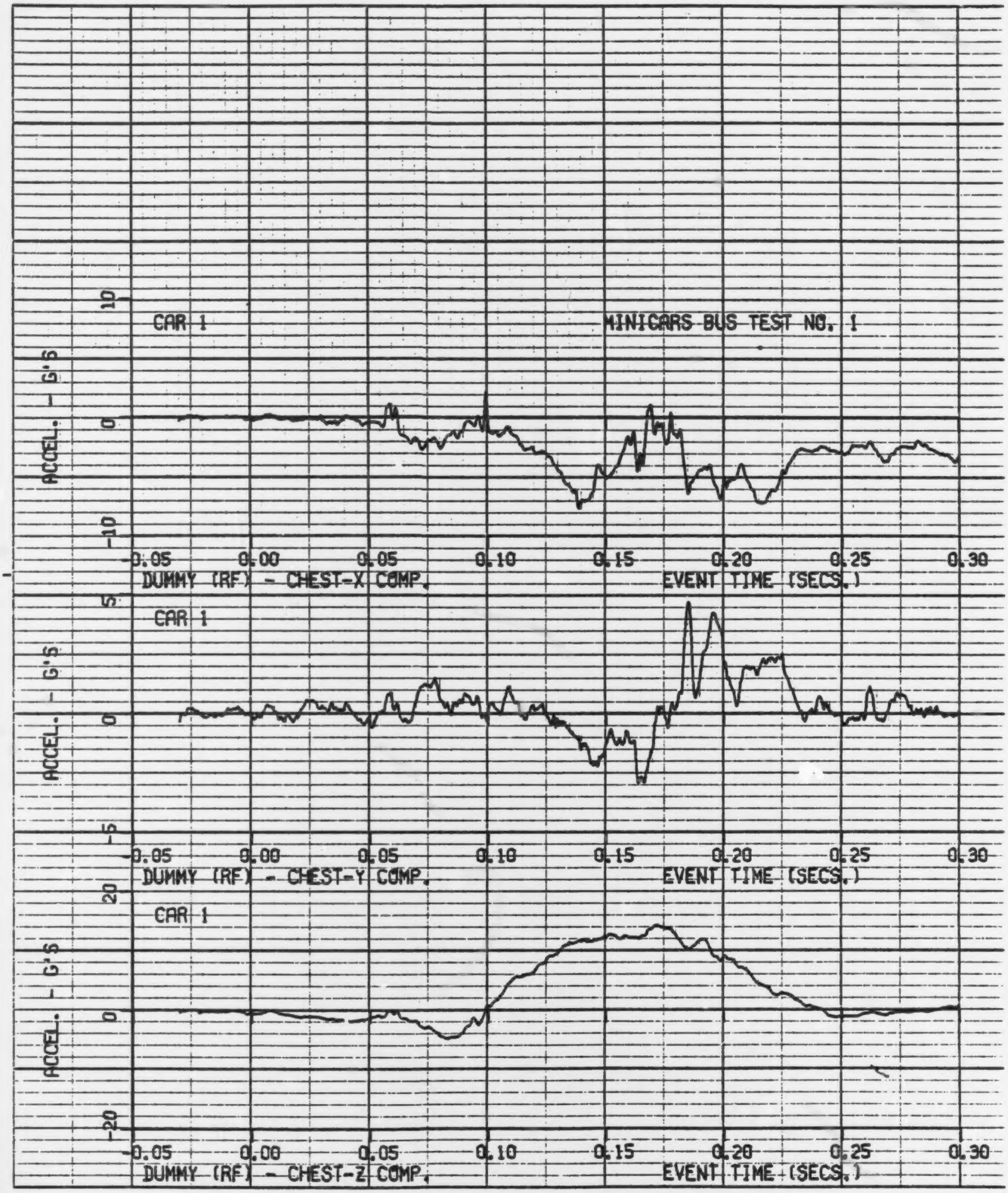


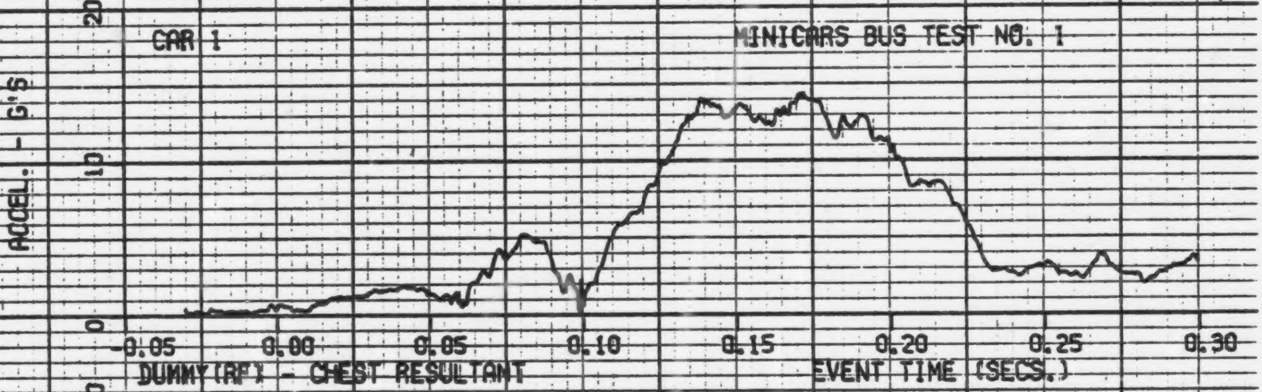


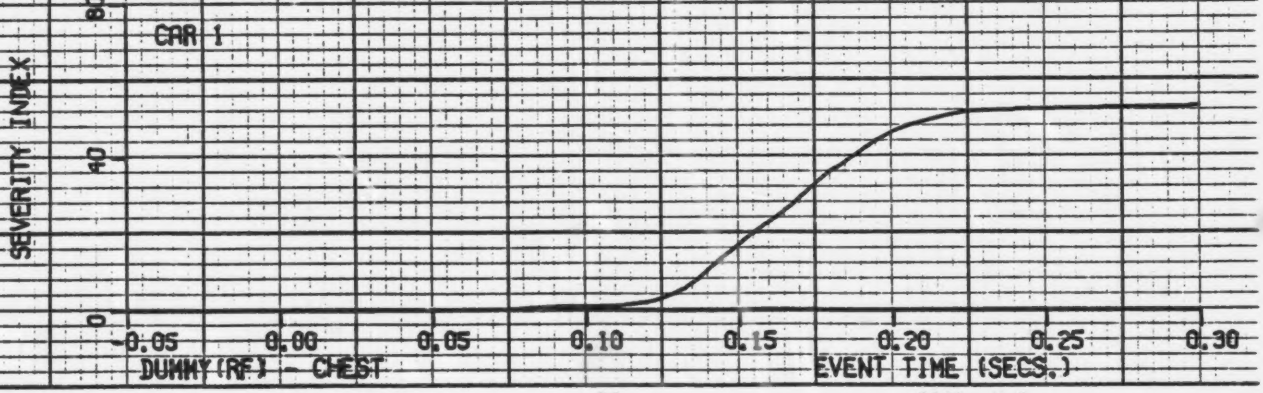
NOTE: ACCELEROMETER LOCATED ON BACK FACE OF IMPACT BARRIER.

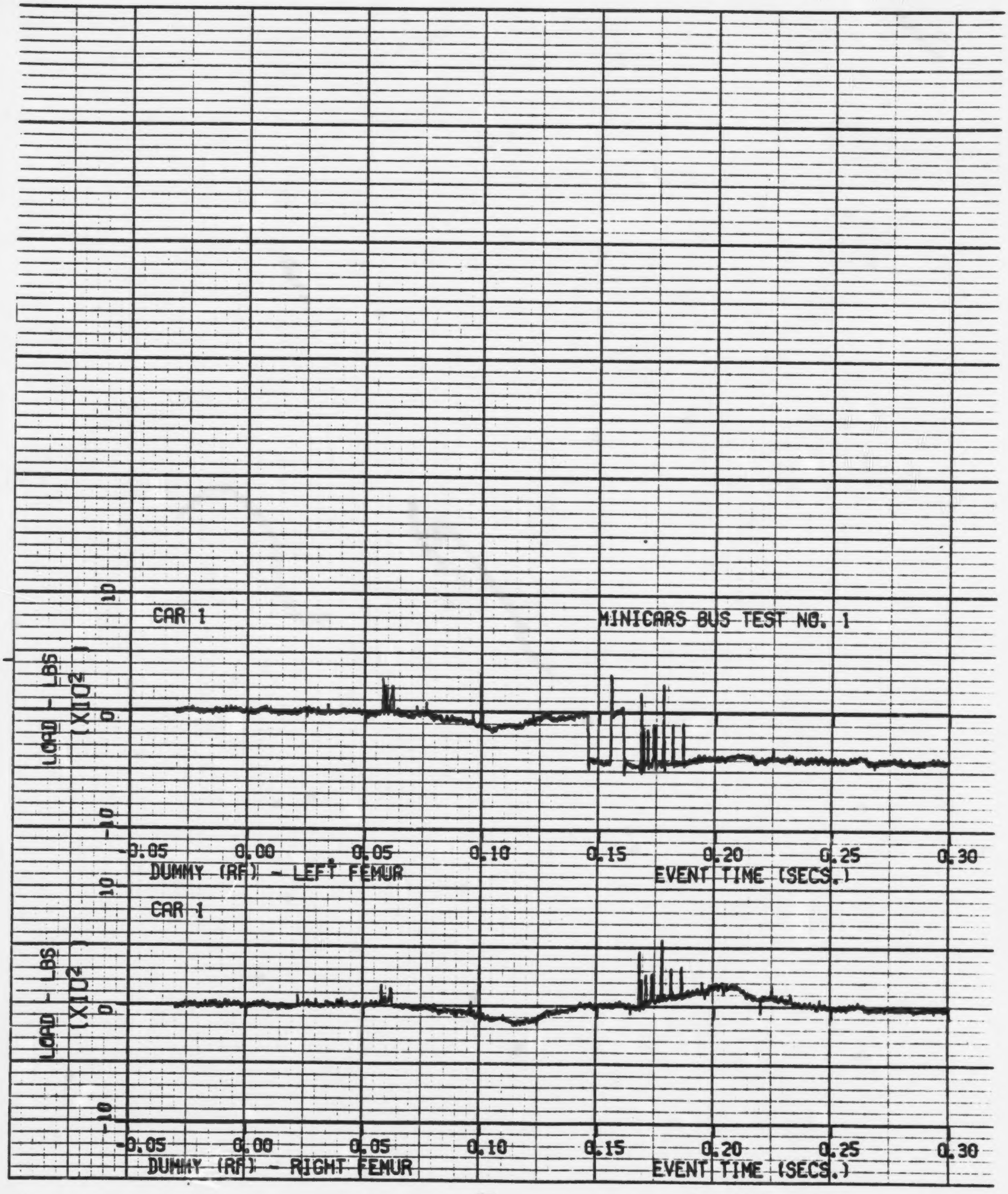

CAR 1
MINICARS BUS TEST NO. 1
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY (RF) - HEAD-X COMP.
EVENT TIME (SECS.)
CAR 1
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY (RF) - HEAD-Y COMP.
EVENT TIME (SECS.)
CAR 1
ACCEL. - G'S (X10^1)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY (RF) - HEAD-Z COMP.
EVENT TIME (SECS.)


ACCEL. - G'S
100
50
0
CAR 1
MINICARS BUS TEST NO. 1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY(RF) - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
(X10^1)
80
40
0
CAR 1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY(RF) - HEAD
EVENT TIME (SECS.)


CAR 1
MINICARS BUS TEST NO. 1
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY (RF) - CHEST-X COMP.
EVENT TIME (SECS.)
CAR 1
ACCEL. - G'S
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY (RF) - CHEST-Y COMP.
EVENT TIME (SECS.)
CAR 1
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY (RF) - CHEST-Z COMP.
EVENT TIME (SECS.)


CAR 1
MINICARS BUS TEST NO. 1
ACCEL. - G'S
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY(RF) - CHEST RESULTANT
EVENT TIME (SECS.)


CAR 1
SEVERITY INDEX
80
40
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY(RF) - CHEST
EVENT TIME (SECS.)


CAR 1
MINICARS BUS TEST NO. 1
LOAD - LBS
(X10²)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY (RF) - LEFT FEMUR
EVENT TIME (SECS.)
CAR 1
LOAD - LBS
(X10²)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY (RF) - RIGHT FEMUR
EVENT TIME (SECS.)

APPENDIX A

CONVENTIONAL 66-PASSENGER SCHOOL BUS CRASH TESTS

BUS CRASH TEST PROGRAM

TEST NO. 2 & TEST No. 3

Donald A. Alianello

Calspan Report No. 6440-V-2

Prepared for:

MINICARS, INC.
55 DEPOT ROAD
GOLETA, CALIFORNIA 93017

APRIL 1979
TECHNICAL REPORT
PURCHASE ORDER NO. 5458 IN SUPPORT OF:
NHTSA CONTRACT NO. DOT-HS-7-01774

TEST: TEST NO. 2 AND TEST NO. 3
(CARPENTER SCHOOL BUS)

TYPE OF TEST: TEST NO. 2, FRONTAL FIXED BARRIER
TEST NO. 3, MOVING BARRIER INTO SIDE OF BUS

TEST DATE: 1-23-79 AND 1-27-79

29

TABLE OF CONTENTS

	Page No.
LIST OF FIGURES	iii
LIST OF TABLES	iv
PRESENTATION OF RESULTS	1
TEST OBJECTIVE	2
GENERAL COMMENTS - TEST NO. 2	4
GENERAL COMMENTS - TEST NO. 3	20
APPENDIX I - TEST NO. 2	33
APPENDIX 2 - TEST NO. 3	47

30

LIST OF FIGURES

Figure No.		Page No.
1	PHOTOGRAPHIC MARKINGS AND VEHICLE DIMENSIONS	8
2	PRE-TEST NO. 2, EXTERIOR VIEWS	9
3	POST-TEST NO. 2, EXTERIOR VIEWS	10
4	PRE-TEST NO. 2, INTERIOR VIEWS	11
5	POST-TEST NO. 2, INTERIOR VIEWS	12
6	WHEELCHAIR TIE-DOWNS USED FOR TESTS NOS. 2 & 3	13
7	ACCELEROMETER LOCATIONS AND COMPONENTS RECORDED FOR TEST NO. 2	14
8	DUMMY LOCATIONS AND TRANSDUCER SIGNALS RECORDED FOR TEST NO. 2	15
9	PRE- AND POST-TEST NO. 2 - DUMMY LOCATIONS	16
10	ON-BOARD CAMERA COVERAGE FOR TEST NO. 2	17
11	OFF-BOARD CAMERA COVERAGE FOR TEST NO. 2	18
12	PRE- AND POST-TEST NO. 3, EXTERIOR VIEWS	23
13	PRE-TEST NO. 3, INTERIOR VIEWS	24
14	POST-TEST NO. 3, INTERIOR VIEWS	25
15	PRE- AND POST-TEST NO. 3, DAMAGE TO MOVING BARRIER	26
16	SIDE INTRUSION MEASUREMENTS (CRUSH)	27
17	ACCELEROMETER LOCATION AND COMPONENTS RECORDED FOR TEST NO. 3	28
18	DUMMY LOCATIONS AND TRANSDUCER SIGNALS RECORDED FOR TEST NO. 3	29
19	PRE- AND POST-TEST NO. 3 - DUMMY LOCATIONS	30
20	ON-BOARD CAMERA COVERAGE FOR TEST NO. 3	31
21	OFF-BOARD CAMERA COVERAGE FOR TEST NO. 3	32

LIST OF TABLES

Table No.		Page No.
1	CRASH TEST SUMMARY - TEST NO. 2	3
2	BUS TEST WEIGHTS - TEST NO. 2	6
3	POST-CRASH DATA SHEET - TEST NO. 2	7
4	CRASH TEST SUMMARY - TEST NO. 3	19
5	DUMMY INJURY CRITERIA VALUES -TEST NO. 3	21
6	BUS AND BARRIER TEST WEIGHTS - TEST NO. 3	22

PRESENTATION OF RESULTS

This test report presents all the test results obtained from Test No. 2 (Frontal Barrier Impact) and Test No. 3 (Moving Barrier Impact) which were performed on January 23 and January 27, 1979 at Calspan's Crash Test Facility in Buffalo, New York on a Carpenter School Bus.

Included in this document are still photographs of all pre- and post-test conditions of the test vehicle and dummies. Dummy identification and pre- and post-test positions of all dummies are presented. Instrumentation identification and location of all transducers for all electronic data are presented, along with dummy and vehicle response data in a plotted format. High speed camera locations and camera speeds are listed in table form.

TEST OBJECTIVE

The principal objective in performing the full-scale crash tests on the Carpenter School Bus was to obtain a deceleration crash pulse for the vehicle and to provide a crash environment to test the following parameters:

- Performance of the wheelchair tiedown attachment as shown in Figure 6.
- acquire injury criteria data on the on-board dummies,
- obtain trajectory information on the on-board dummies.

TABLE I

CRASH TEST SUMMARY

TEST NO. 2 **PROJECT** MINCARS BUS TEST

DATE 1/23/79 **TIME** 13:45 **TEMP.** 34°F

TEST CONDITION FRONTAL PERPENDICULAR FIXED BARRIER (20 MPH)

VEHICLE NO. 1 CARPENTER SCHOOL BUS

	VEH. NO. 1
TEST WEIGHT (lbs)	15,430
IMPACT ANGLE (deg)*	0
IMPACT VELOCITY (mph)**	21.27
MAX. CRUSH (in)	21

DUMMIES	**VEH. NO. 1**
TYPE	5-PART 572, HYBRID II 2-6 YR OLD CHILD DUMMIES
LOCATION	SEE FIG. 8
RESTRAINT	SEE FIG. 8

NUMBER OF DATA CHANNELS 72

NUMBER OF HIGH SPEED CAMERAS 12 AND ONE REAL TIME

---

*WITH RESPECT TO TOW TRACK CENTERLINE

**SPEED TRAP MEASUREMENT (±0.5% ACCURACY)

GENERAL COMMENTS

- All cameras functioned properly.
- All photographic lighting functioned properly.
- Body of bus slid forward 9 inches on frame of bus during impact.
- Front side door jammed on lower step and could not be opened easily.
- Dummy No. 8 had a broken shoulder after test.
- Arm rest on side facing seat broke off when loaded by six-year old dummy.
- The front facing wheelchair and dummy knocked-down guide rail that was installed in front of dummy and chair.
- Side facing wheelchair was held in place during impact by the floor mount that had been installed; there was some bending of the frame and wheels.
- Driver's seat moved forward and down during the impact and allowed the driver's seat belt to go slack.
- Due to a malfunction of the instrumentation caused by the improper connection of the instrumentation batteries the following data channels were lost.

(1) Dummy No. 3 - Head X,Y,Z; Chest X,Y,Z
(2) Dummy No. 4 - Head X,Y,Z; Chest X,Y,Z
Left and right femur loads.
(3) Dummy No. 5 - Head X,Y,Z; Chest X,Y,Z
(4) Dummy No. 6 - Head X,Y,Z; Chest X,Y,Z
(5) Dummy No. 7 - Head X,Y,Z; Chest X,Y,Z

(6) Position No. 7, Vehicle Acceleration X,Y
(7) Position No. 8, Vehicle Acceleration X,Y

- There was a total of 38 channels of data lost and 34 channels of data recorded for this test. The plots of the data are presented in Appendix 1.

- Because of the excessive amount of data lost, a rerun of the frontal barrier test will be performed at a later date.

TABLE 2

BUS TEST WEIGHTS - TEST NO. 2

LEFT FRONT	3000 LBS
RIGHT FRONT	3030 LBS
TOTAL FRONT	6030 LBS

LEFT REAR	4550 LBS
RIGHT REAR	4850 LBS
TOTAL REAR	9400 LBS

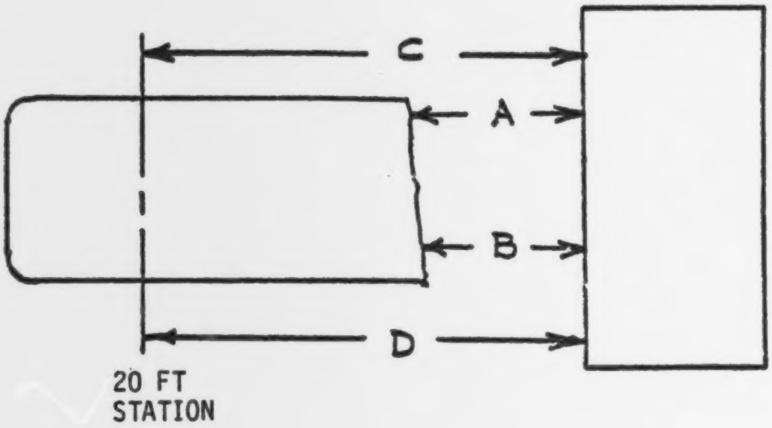
TOTAL WEIGHT = 6030 LBS + 9400 LBS = 15,430 LBS

WHEEL BASE = 261 INCHES

$$Cg_{FW} = \frac{9400\ (LBS) \bullet 261\ (INCHES)}{15430\ LBS} = 158.39\ INCHES$$

TABLE 3

POST-CRASH DATA SHEET
BUS TEST NO. 2



DIMENSIONS:

A = 8.25 INCHES

B = 9.75 INCHES

C = 226.75 INCHES

D = 228.25 INCHES

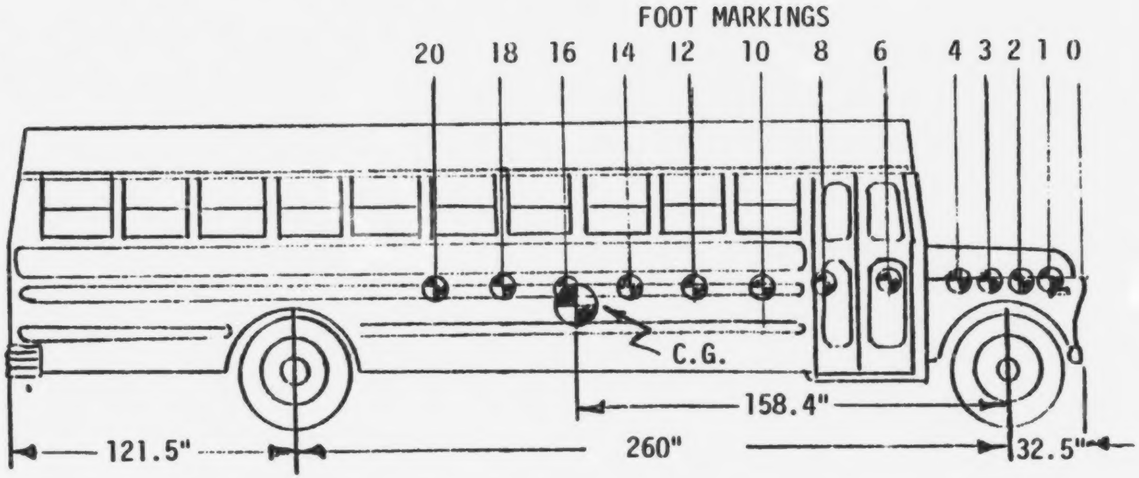
$E = \frac{A + B}{2} = 8.5$ INCHES (REBOUND)

$F = \frac{C + D}{2} = 227.5$ INCHES

G = = F - E = 219 INCHES

CRUSH = 240 - 219 = 21 INCHES

40


FOOT MARKINGS
20
18
16
14
12
10
8
6
4
3
2
1
0
C.G.
158.4"
121.5"
260"
32.5"

6440-V-2

Figure 1 PHOTOGRAPHIC MARKINGS AND VEHICLE DIMENSION

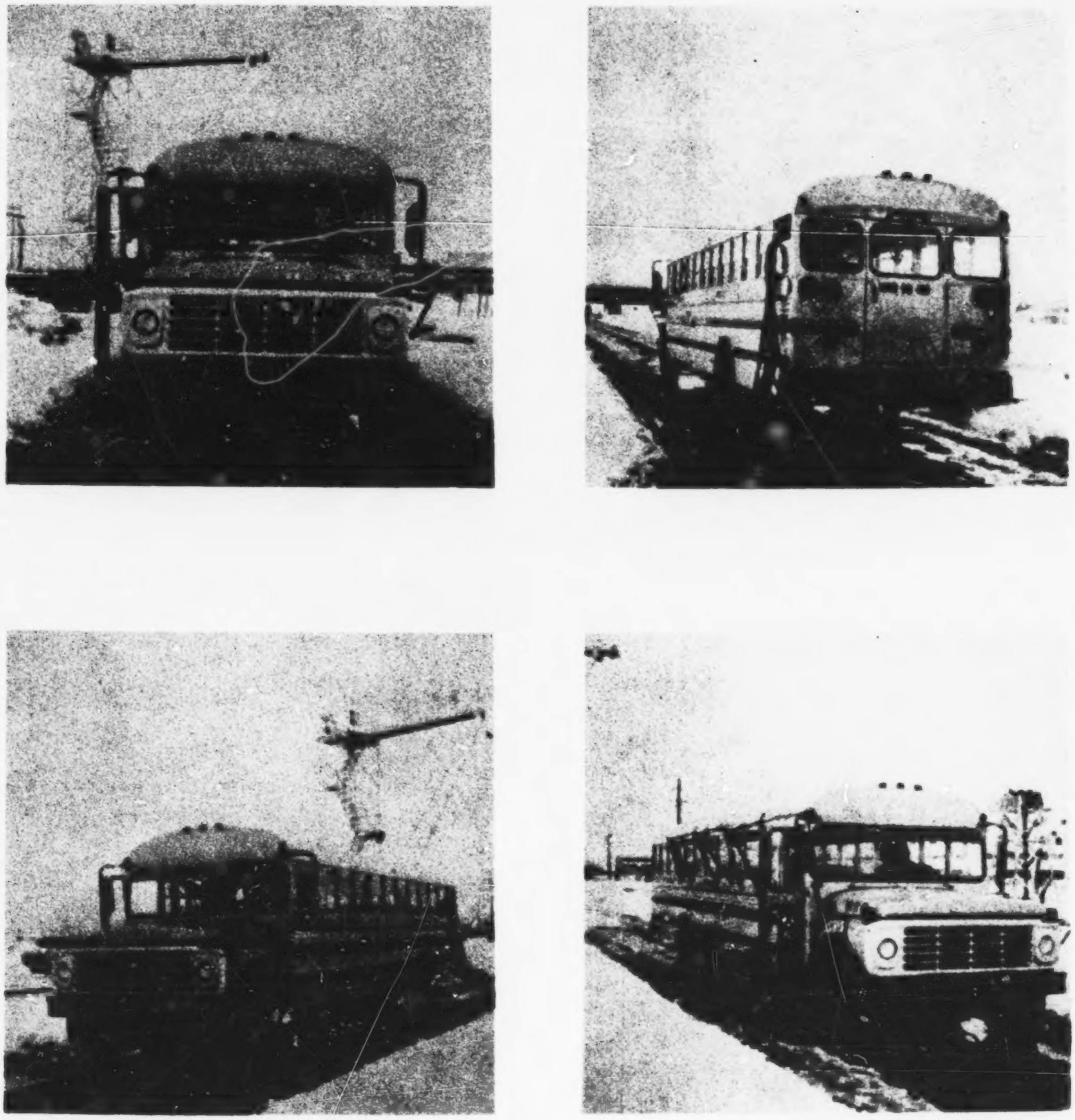


Figure 2 PRE-TEST NO. 2, EXTERIOR VIEWS

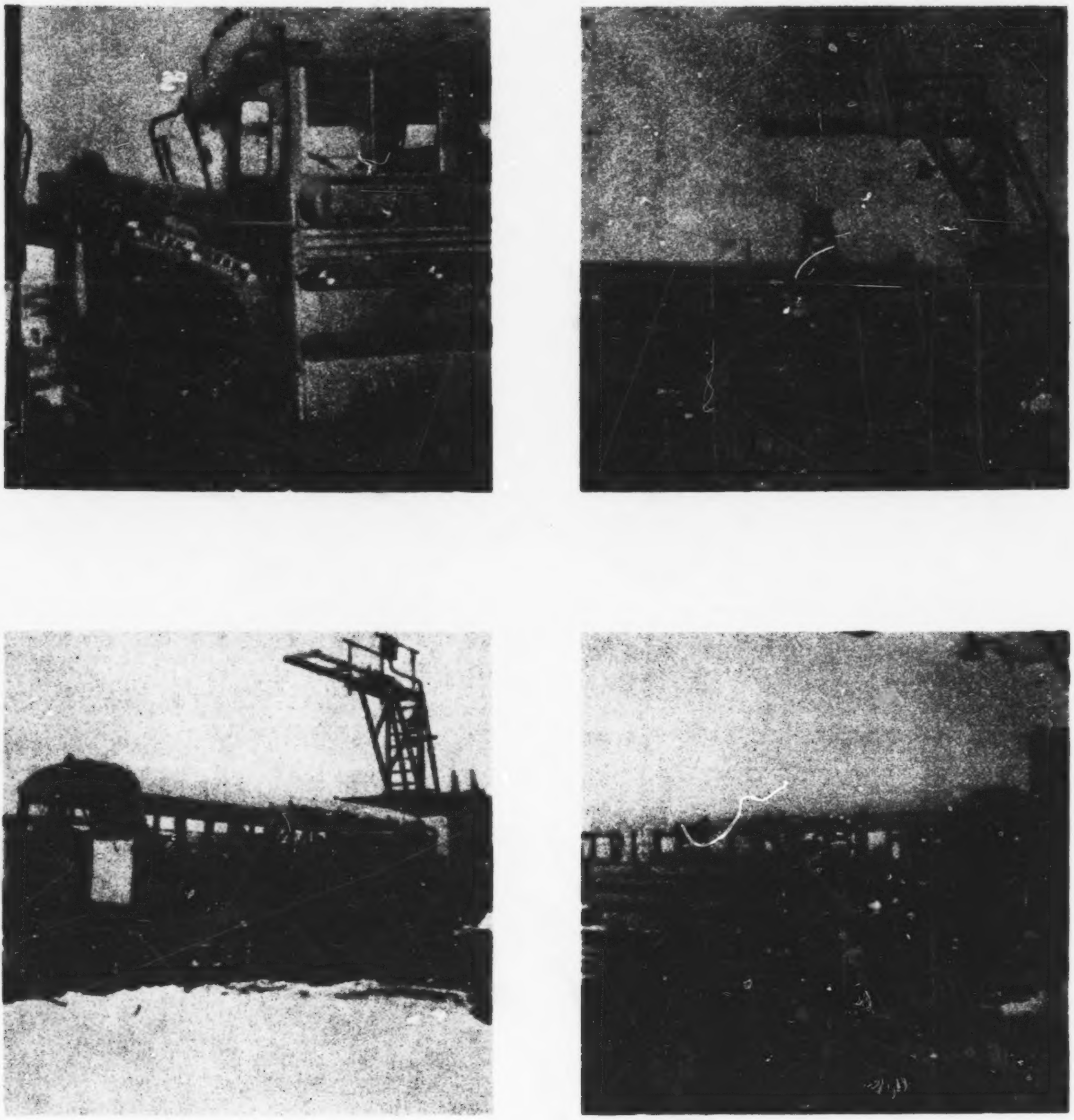


Figure 3 POST-TEST NO. 2, EXTERIOR VIEWS

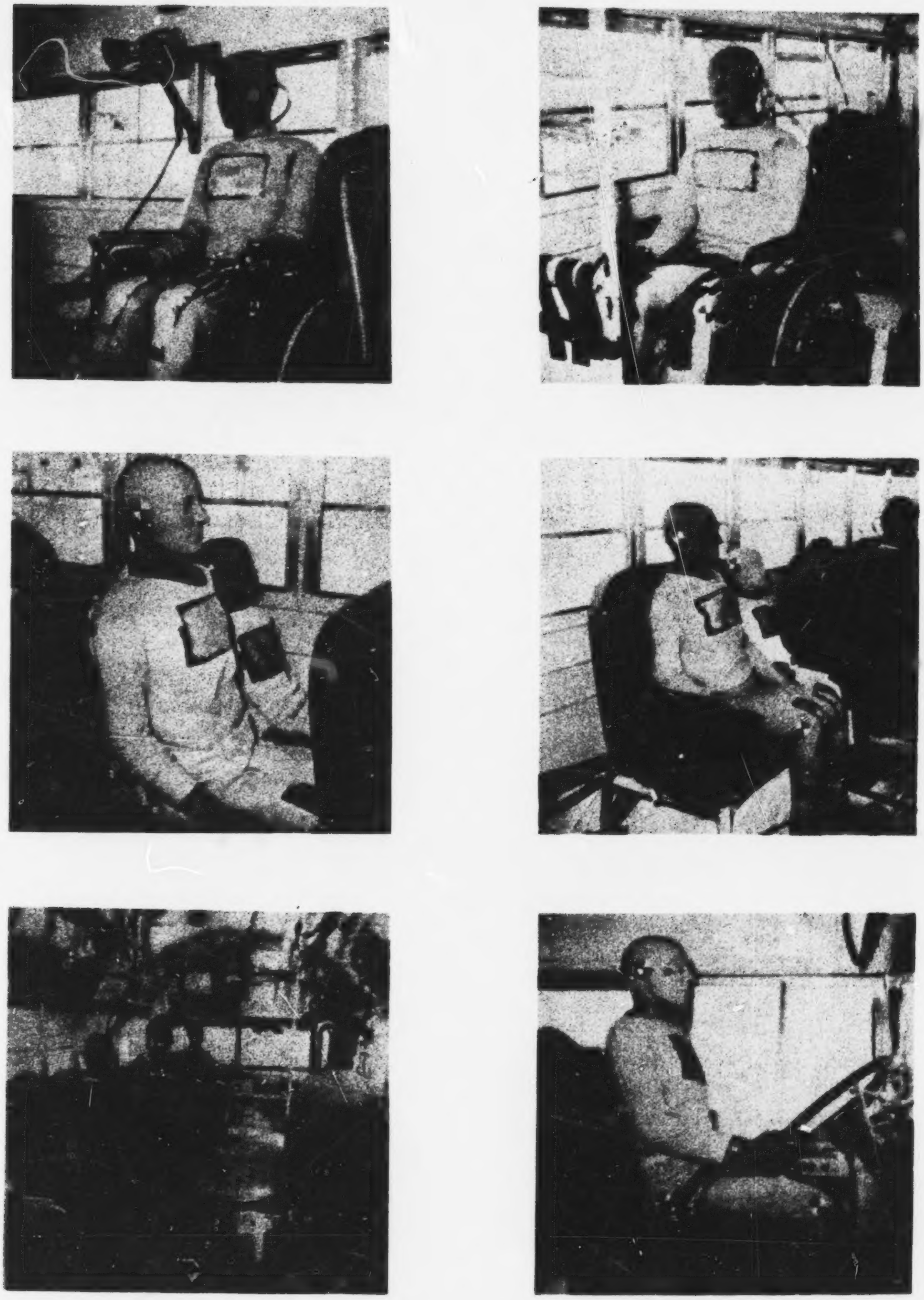


Figure 4 PRE-TEST NO. 2, INTERIOR VIEWS

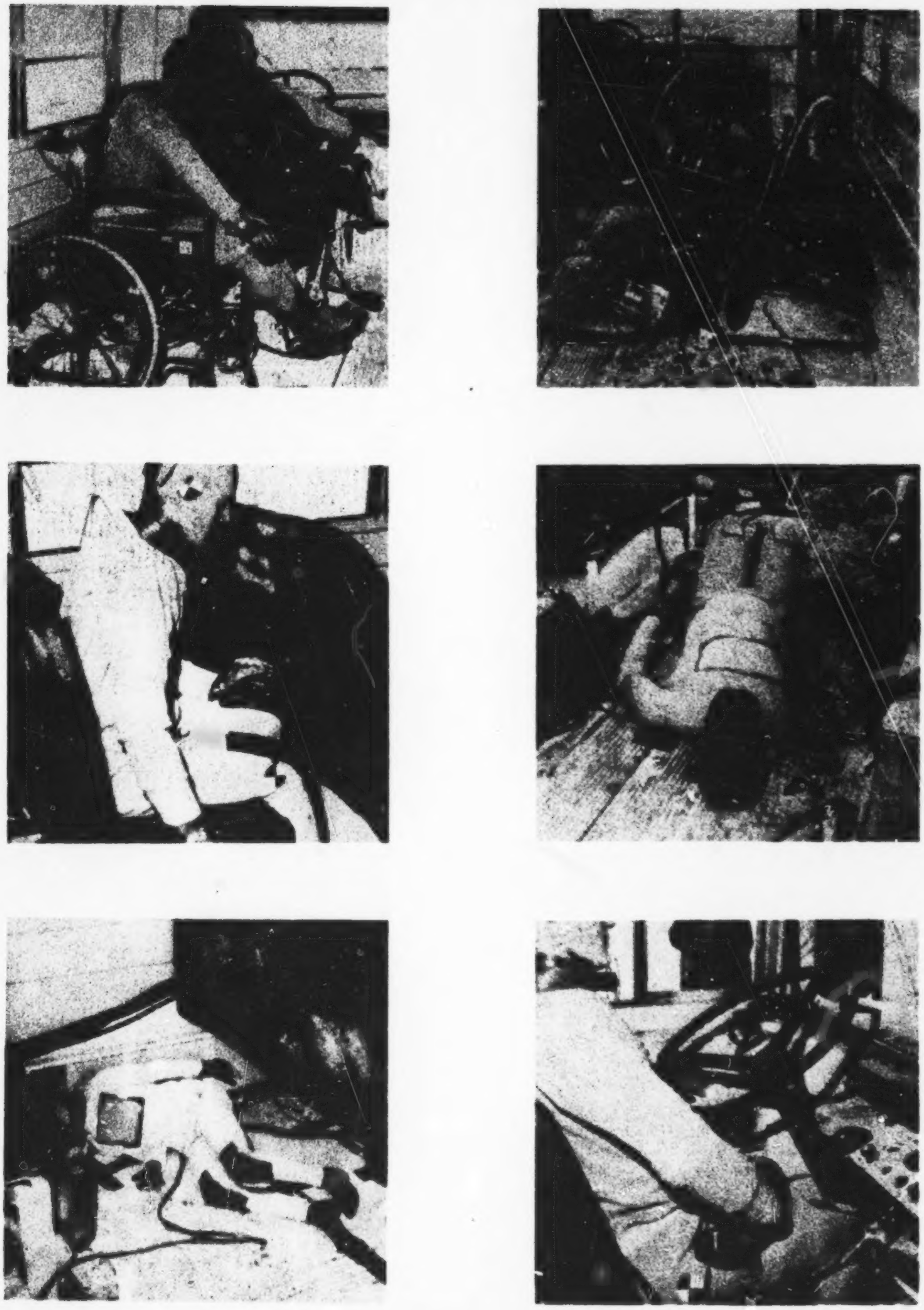


Figure 5 POST-TEST NO. 2, INTERIOR VIEWS

6440-V-2

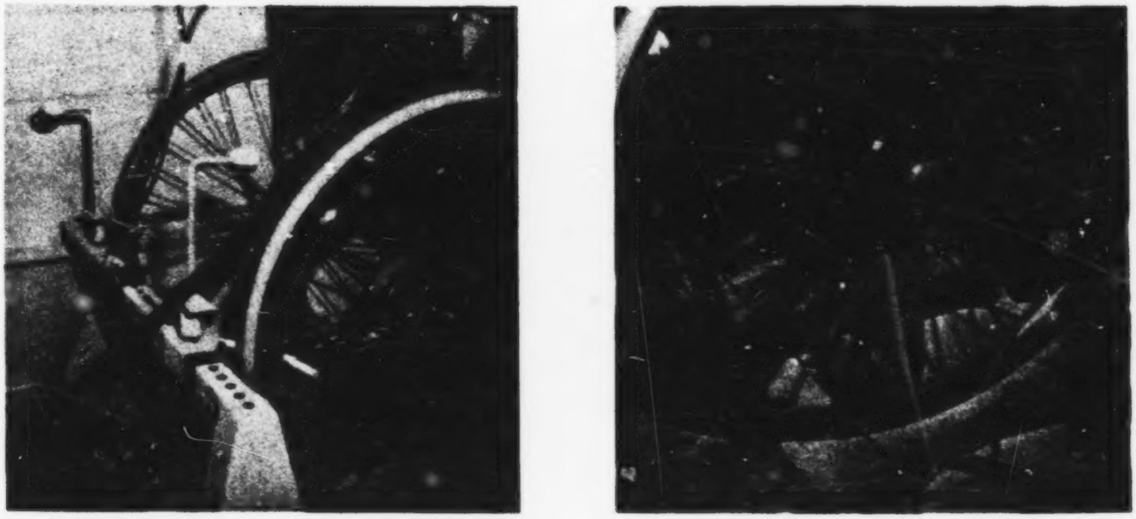
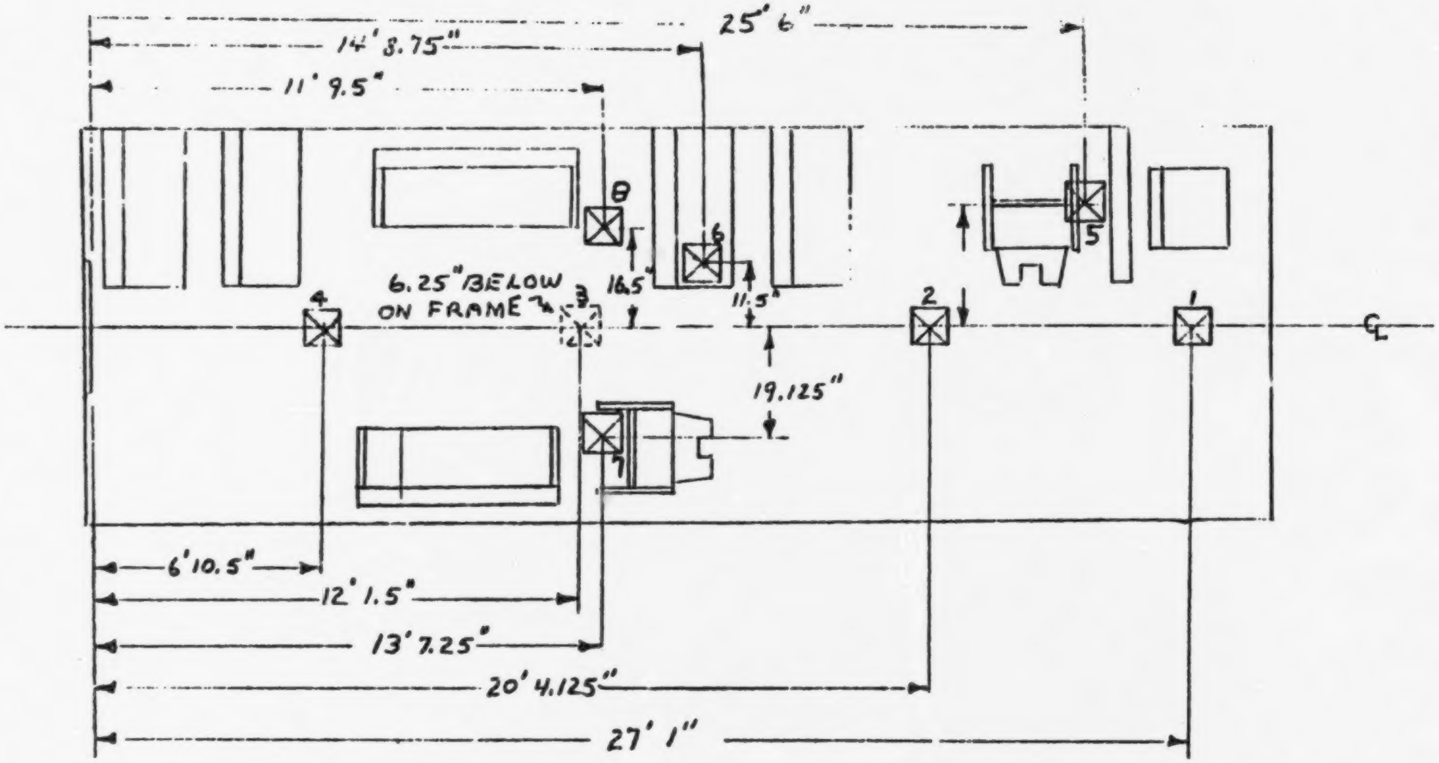


Figure 6 WHEELCHAIR TIE-DOWNS USED FOR TESTS NOS. 2 & 3

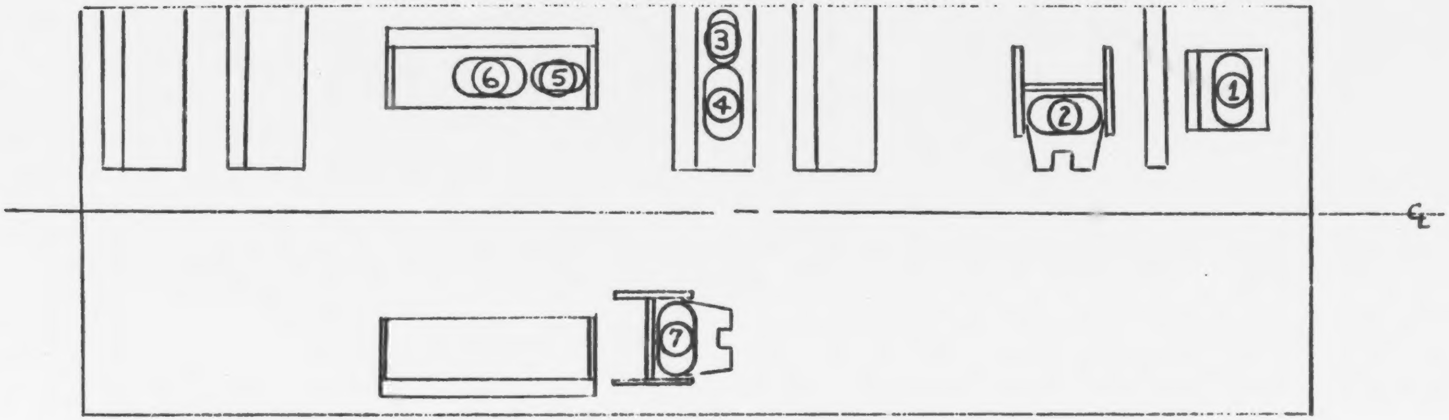


25' 6"
14' 8.75"
11' 9.5"
8
6
5
16.5"
11.5"
6.25" BELOW ON FRAME
4
3
2
1
℄
19.125"
7
6' 10.5"
12' 1.5"
13' 7.25"
20' 4.125"
27' 1"

ACCEL. NO.	ACCEL. COMP.
1	X Y Z
2	X Y Z
3	X Y Z
4	X Y Z
5	X Z
6	X Z
7	X Z
8	X Z

Figure 7 ACCELEROMETER LOCATIONS AND COMPONENTS RECORDED FOR TEST NO. 2

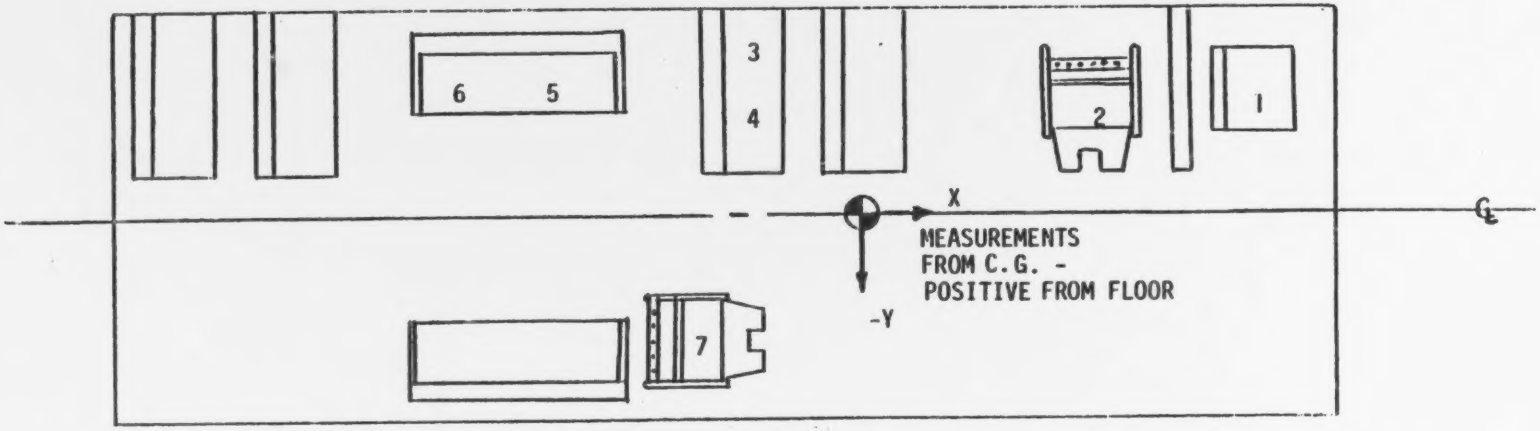
6440-V-2



DUMMY POS. & TYPE	TRANSDUCERS			
	HEAD (ACCEL.)	CHEST (ACCEL.)	FEMUR (LOADS)	BELTS (LOADS)
(1) 50%	X, Y, Z	X, Y, Z	--	RIGHT, LEFT
(2) 50%	X, Y, Z	X, Y, Z	--	RIGHT, LEFT
(3) 6-YR OLD	X, Y, Z	X, Y, Z	--	--
(4) 50%	X, Y, Z	X, Y, Z	RIGHT, LEFT	--
(5) 6-YR OLD	X, Y, Z	X, Y, Z	--	--
(6) 50%	X, Y, Z	X, Y, Z	RIGHT, LEFT	--
(7) 50%	X, Y, Z	X, Y, Z	--	RIGHT, LEFT

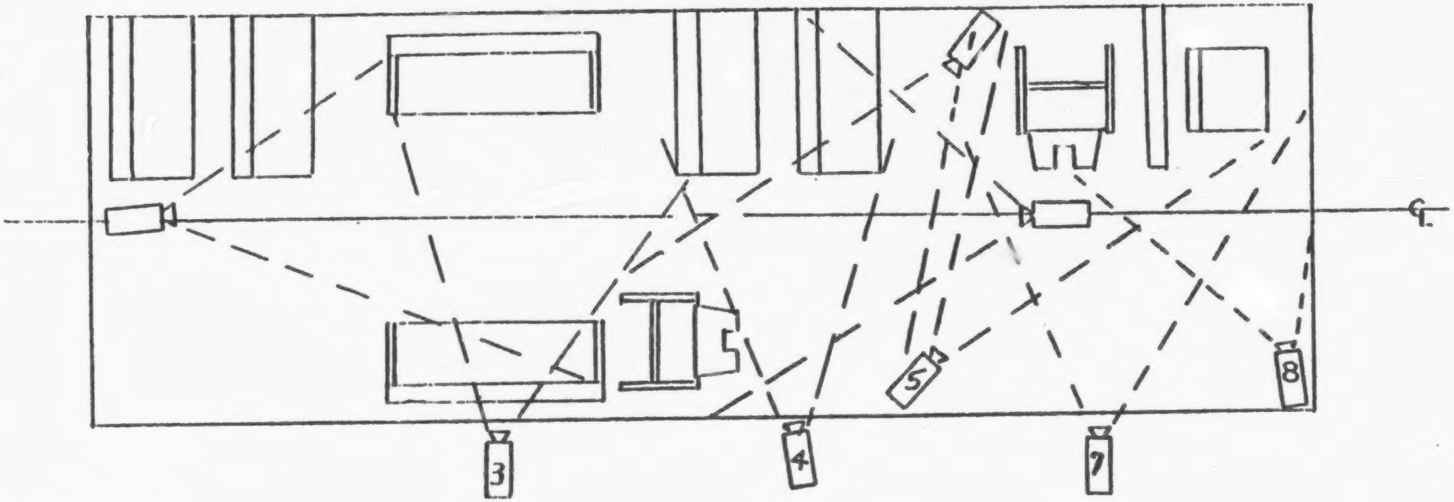
6440-V-2

Figure 8 DUMMY LOCATIONS AND TRANSDUCER SIGNALS RECORDED FOR TEST NO. 2



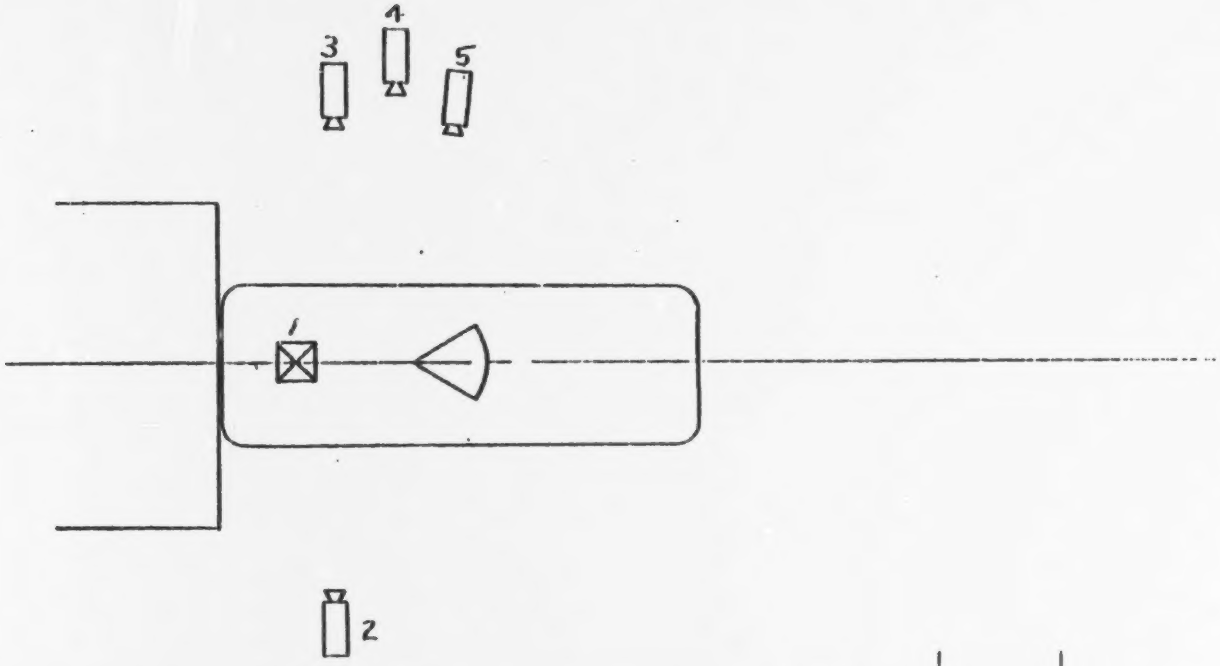
DUMMY LOCATION		HEAD TARGET			HIP TARGET			KNEE TARGET		
		X	Y	Z	X	Y	Z	X	Y	Z
POS. 1	PRE	91	13	48.5	93	11	21	109	12	20.5
	POST	94	22	48.5	100	11	21	115	12	20.25
POS. 2	PRE	57	28.5	49.5	53	25	21	54	12	24
	POST	72	25	47.0	56	33	22.5	63	11	23
POS. 3	PRE	-43.5	28.5	51.5	-41	24	22	-25	24	33
	POST	-50.0	32	35.0	-42	34	21	-30	32	12
POS. 4	PRE	51.5	17	45.5	-51.5	15.5	19.5	-36	15.5	20
	POST	-42.0	21	46	-50	18	20	-37	11.5	19
POS. 5	PRE	-89	39	35.5	-94	19	28.5	-94	18.5	18.5
	POST	-77	4.5	42.	-57	0	24	-63	23	0
POS. 6	PRE	-108	26	34	-112	21	32.5	-109.5	19.5	15
	POST	-145	14.5	5	-119	9	5	-106	5	23
POS. 7	PRE	-49.5	-32.5	38	-49.5	-33	19	-36	-34	19
	POST	40.0	-28.5	5	16	-22	19.5	13	23	4.5

Figure 9 PRE-AND POST-TEST NO. 2 - DUMMY LOCATIONS



LOC. NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)	FIELD OF VIEW
1	AS SHOWN	STALEX	8	800	AS SHOWN
2	AS SHOWN	STALEX	8	1050	AS SHOWN
3	AS SHOWN	STALEX	8	1150	AS SHOWN
4	AS SHOWN	PHOTOSONICS	8	325	AS SHOWN
5	AS SHOWN	PHOTOSONICS	8	1200	AS SHOWN
6	AS SHOWN	PHOTOSONICS	8	1000	AS SHOWN
7	AS SHOWN	PHOTOSONICS	8	350	AS SHOWN
8	AS SHOWN	PHOTOSONICS	8	900	AS SHOWN

Figure 10 ON-BOARD CAMERA COVERAGE FOR TEST NO. 2



LOC. NO.	LOCATION	FIELD OF VIEW	LENS (MM)	SPEED (fps)
1	TOWER	OVERHEAD VIEW	13	225
2	NORTH CLOSE	DRIVER'S SIDE FRONT QUARTER	13	750
3	SOUTH CLOSE	PASSENGER SIDE FRONT QUARTER	13	750
4	SOUTH OVERALL	PASSENGER SIDE FRONT HALF	13	650
5	SOUTH PAN	REAL PAN OF IMPACT	-	24

Figure 11 OFF-BOARD CAMERA COVERAGE FOR TEST NO. 2

TABLE 4

CRASH TEST SUMMARY

TEST NO. 3 **PROJECT** MINICARS BUS TESTS

DATE 1/27/79 **TIME** 14:15 **TEMP.** 35°F

TEST CONDITION MOVING BARRIER TEST (30 MPH)

VEHICLE NO. 1 CARPENTER SCHOOL BUS

VEHICLE NO. 2 SAE MOVABLE BARRIER

	VEH. NO. 1	VEH. NO. 2
TEST WEIGHT (lbs)	15430	4020
IMPACT ANGLE (deg)*	0	90
IMPACT VELOCITY (mph)**	0	30.93
MAX. CRUSH (in)	7.6	-

DUMMIES	VEH. NO. 1
TYPE	5-PART 572 - HYBRID II 2-6-YR. OLD CHILD DUMMIES
LOCATION	SEE FIGURE 17
RESTRAINT	SEE FIGURE 17

NUMBER OF DATA CHANNELS 75

NUMBER OF HIGH SPEED CAMERAS 11 AND ONE REAL TIME

---

*WITH RESPECT TO TOW TRACK CENTERLINE

**SPEED TRAP MEASUREMENT (±0.5% ACCURACY)

GENERAL COMMENTS

- All cameras functioned properly except for the loss of timing on four cameras. See Figure 19.
- All photographic lighting functioned properly.
- Moving Barrier bent during side impact with the bus. It was determined that the bus structure was too stiff at impact point. See Figure 14.
- Injury criteria values were extremely low due to the low-level of crash environment within the bus.
- Front facing wheelchair mount held wheelchair in place during impact and there was no damage to wheelchair.
- Side facing wheelchair mount held wheelchair in place during impact and there was no damage to wheelchair.
- There was some 60 Hz noise on the data traces due to an internal short in one of the on-board cameras. This problem has been corrected and the data plots are presented in Appendix 2.
- The Moving Barrier was instrumented with a triaxial acceleration package and these data are presented in Appendix 2.

TABLE 5

DUMMY INJURY CRITERIA VALUES

BUS TEST NO. 3

HEAD INJURY CRITERION

DUMMY	HIC	T1 (sec.)	T2 (sec.)	AVERG. ACCEL (G)
Pos. 1	1.17	.003	.299	1.7
Pos. 2	2.91	.036	.299	2.6
Pos. 3	8.52	.0009	.123	5.4
Pos. 4	6.33	.055	.244	4.1
Pos. 5	45.25	.020	.074	14.7
Pos. 6	16.72	.041	.299	5.2
Pos. 7	67.86	.132	.140	37.7

CHEST SEVERITY INDEX

DUMMY	RESULTANT (G) (Peak)	S.I.
Pos. 1	3.4	.75
Pos. 2	26.0	140.
Pos. 3	7.2	7.5
Pos. 4	3.4	1.6
Pos. 5	18.0	40.0
Pos. 6	5.0	2.0
Pos. 7	17.0	14.0

BELT LOADS

DUMMY	LEFT (lbs)	RIGHT (lbs)
Pos. 1	40	20
Pos. 2	340	150
Pos. 7	700	600

FEMUR LOADS

DUMMY	LEFT (lbs)	RIGHT (lbs)
Pos. 4	50	0
Pos. 6	0	240

TABLE 6

BUS AND BARRIER TEST WEIGHTS - TEST NO. 3

- CARPENTER BUS WEIGHT SAME AS TEST NO. 2 - SEE TABLE 2 - 15,430 LBS.

- MOVING BARRIER TEST WEIGHT

LEFT FRONT = 940 LBS
RIGHT FRONT = 1410 LBS
TOTAL FRONT = 2350 LBS

LEFT REAR = 1050 LBS
RIGHT REAR = 620 LBS
TOTAL REAR = 1670 LBS

TOTAL WEIGHT = 2350 LBS + 1670 LBS = 4020 LBS.

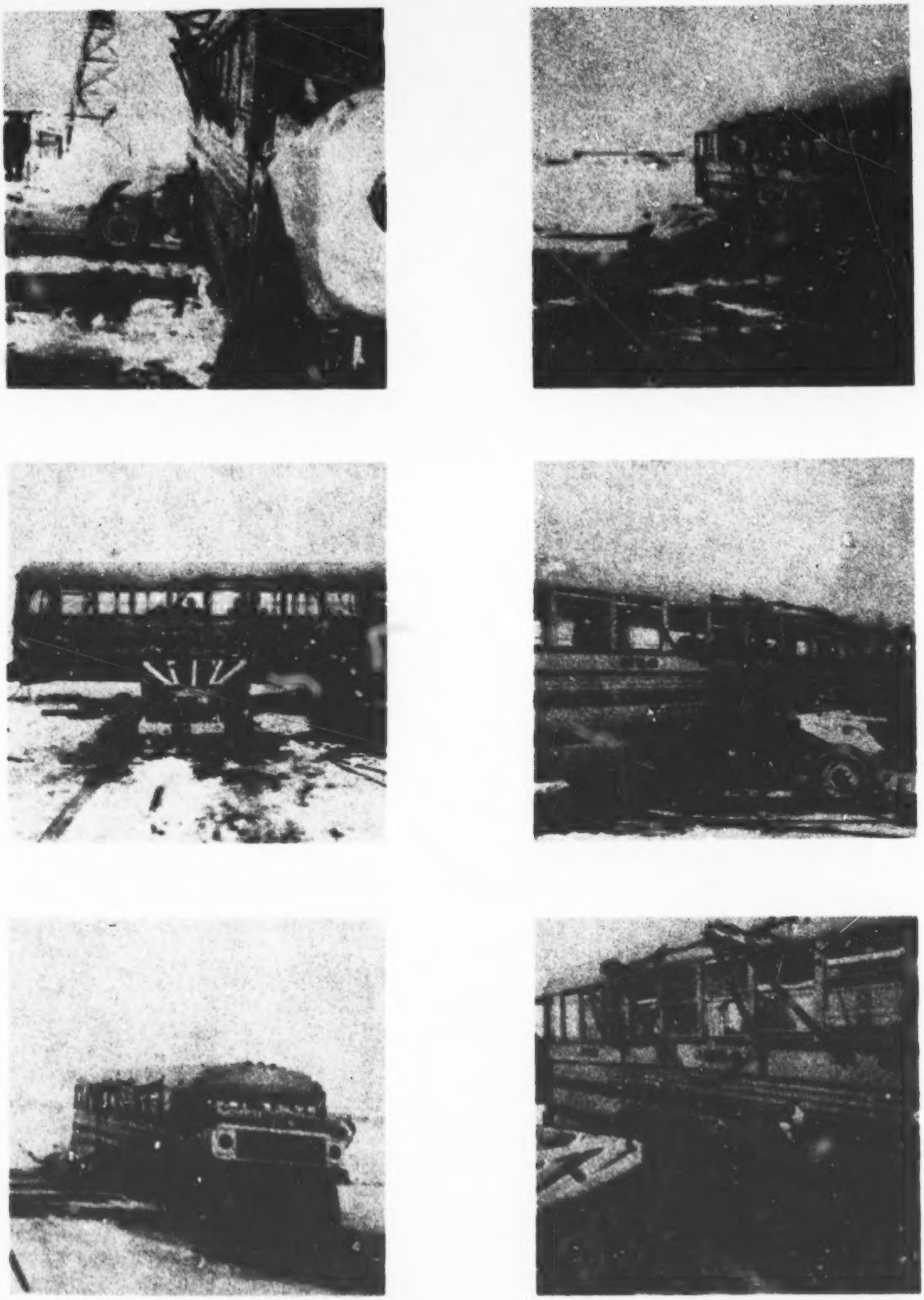


Figure 12 PRE- AND POST-TEST NO. 3, EXTERIOR VIEWS

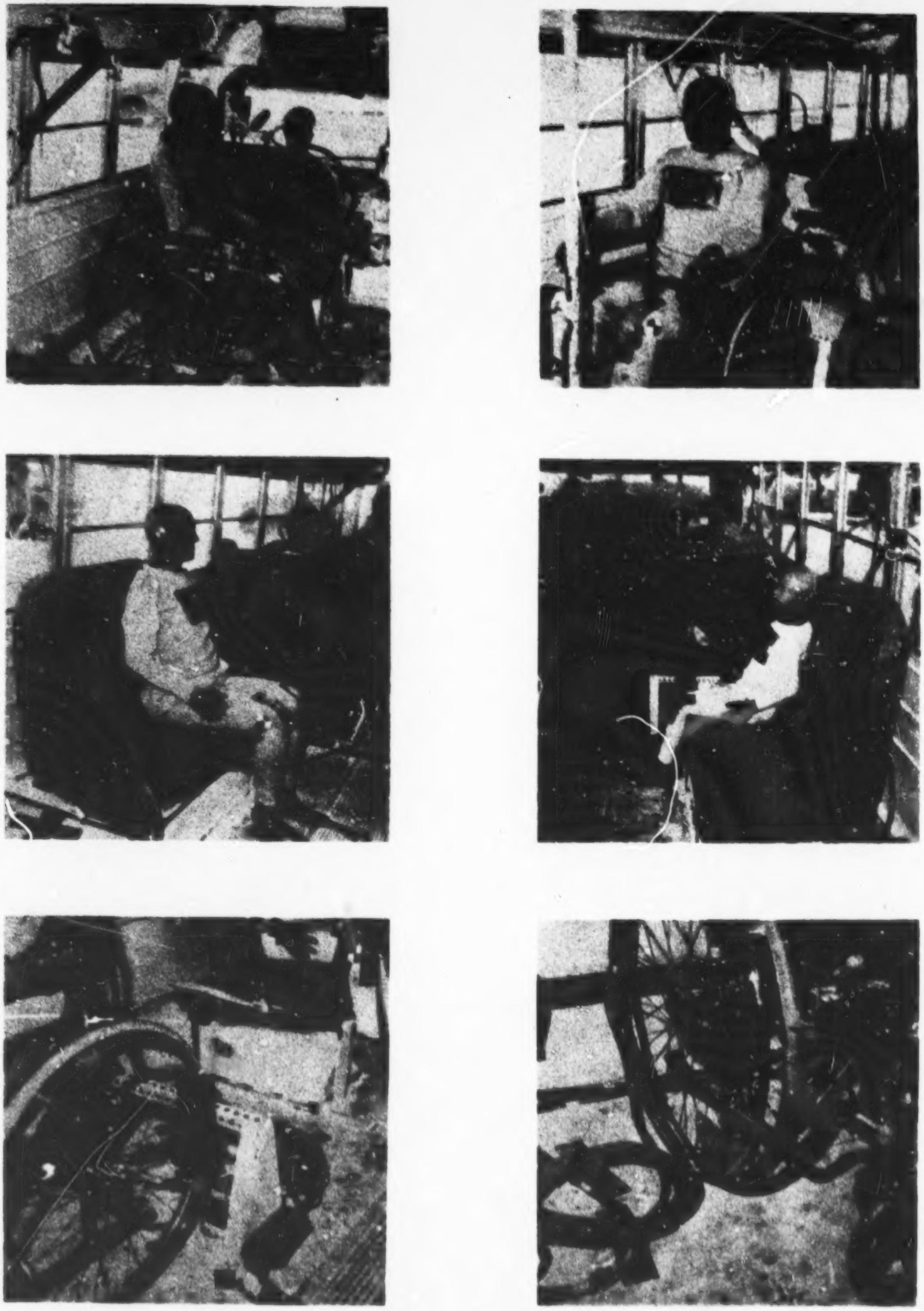


Figure 13 PRE-TEST NO. 3, INTERIOR VIEWS

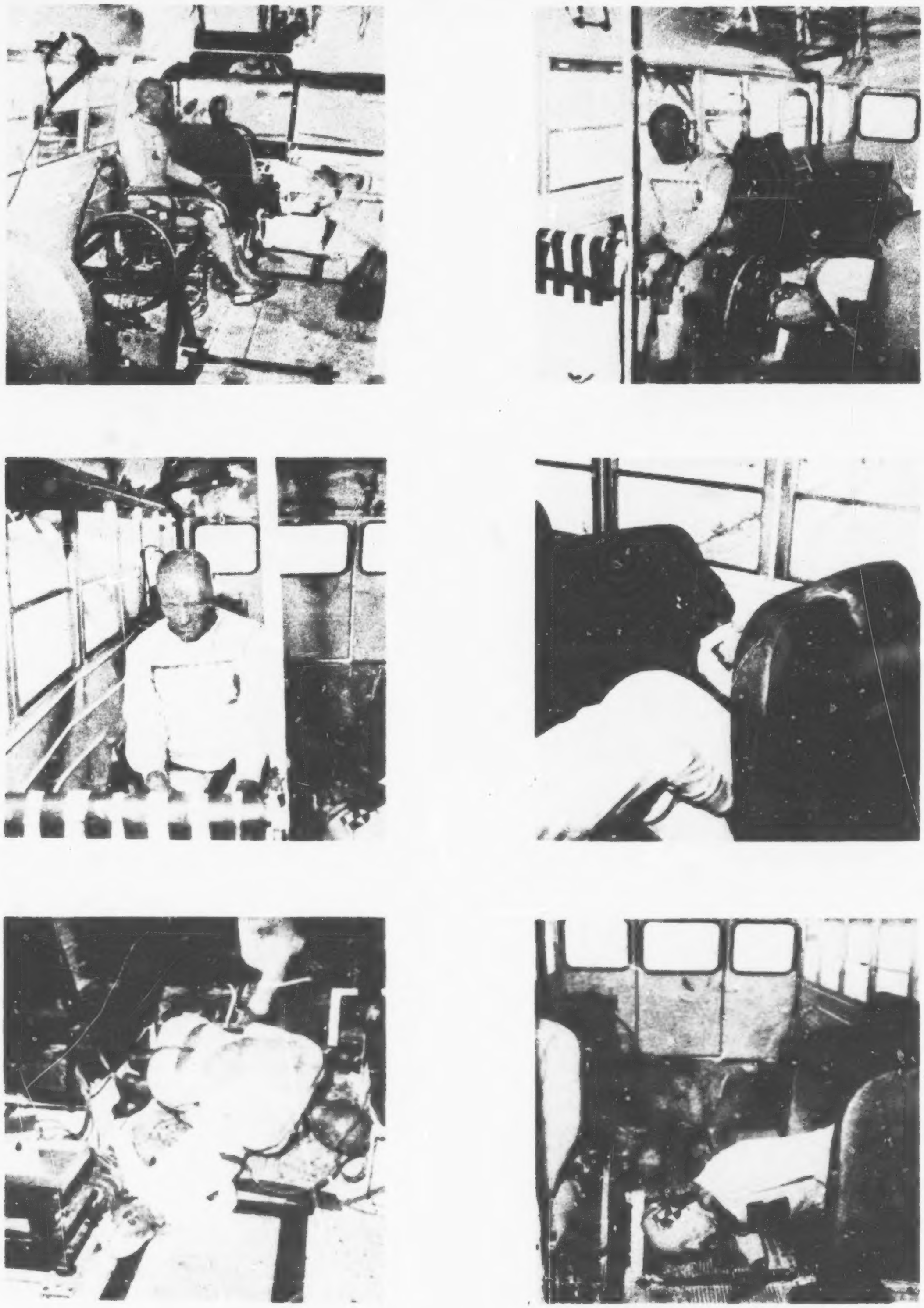


Figure 14 POST-TEST NO. 3, INTERIOR VIEWS

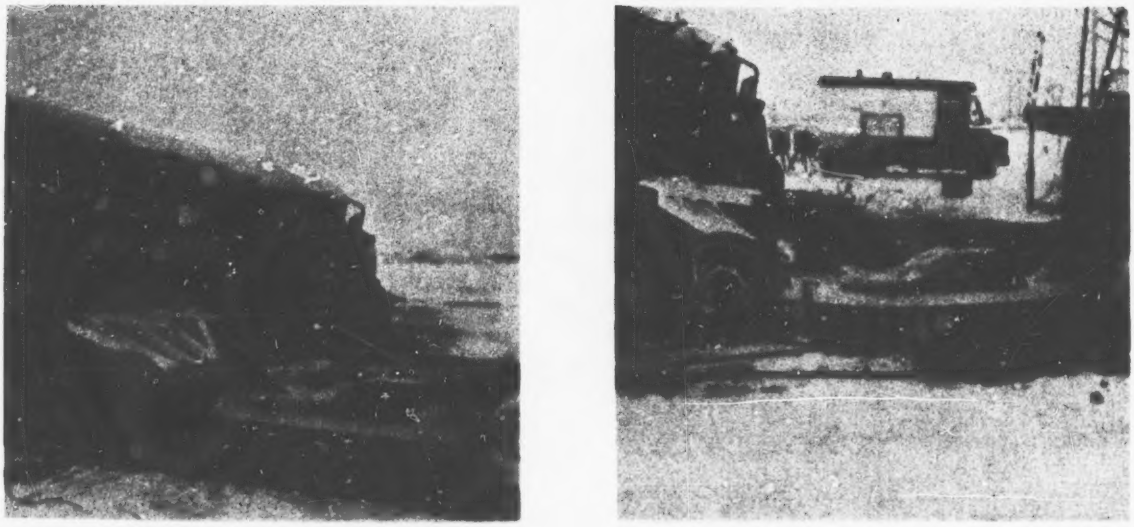
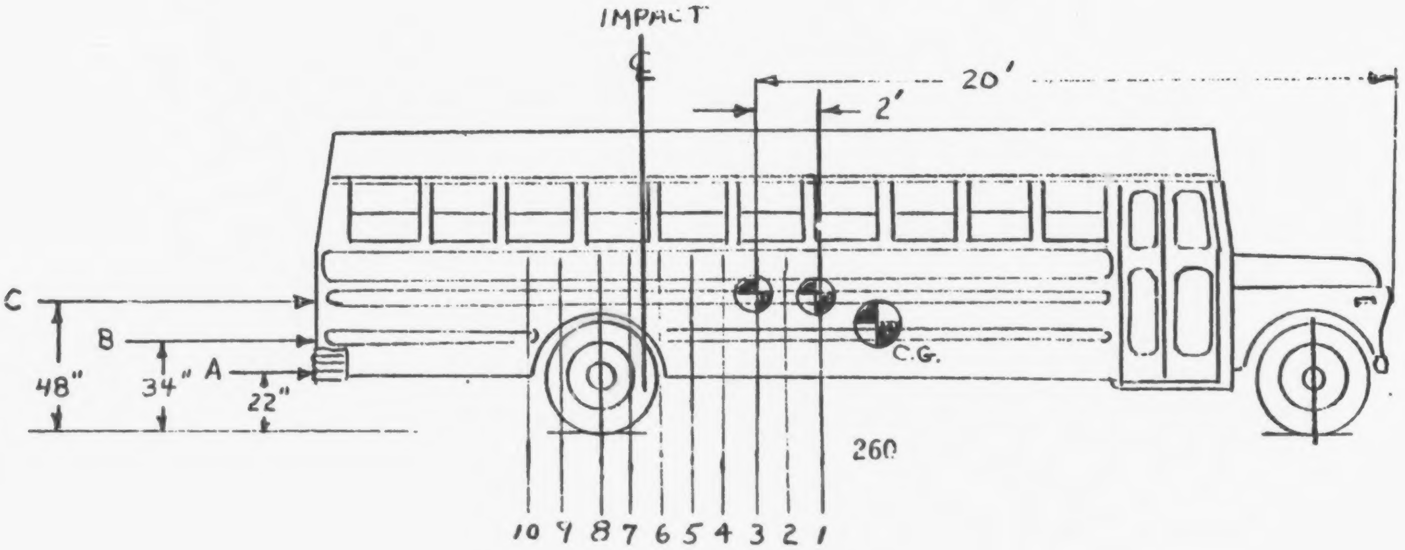


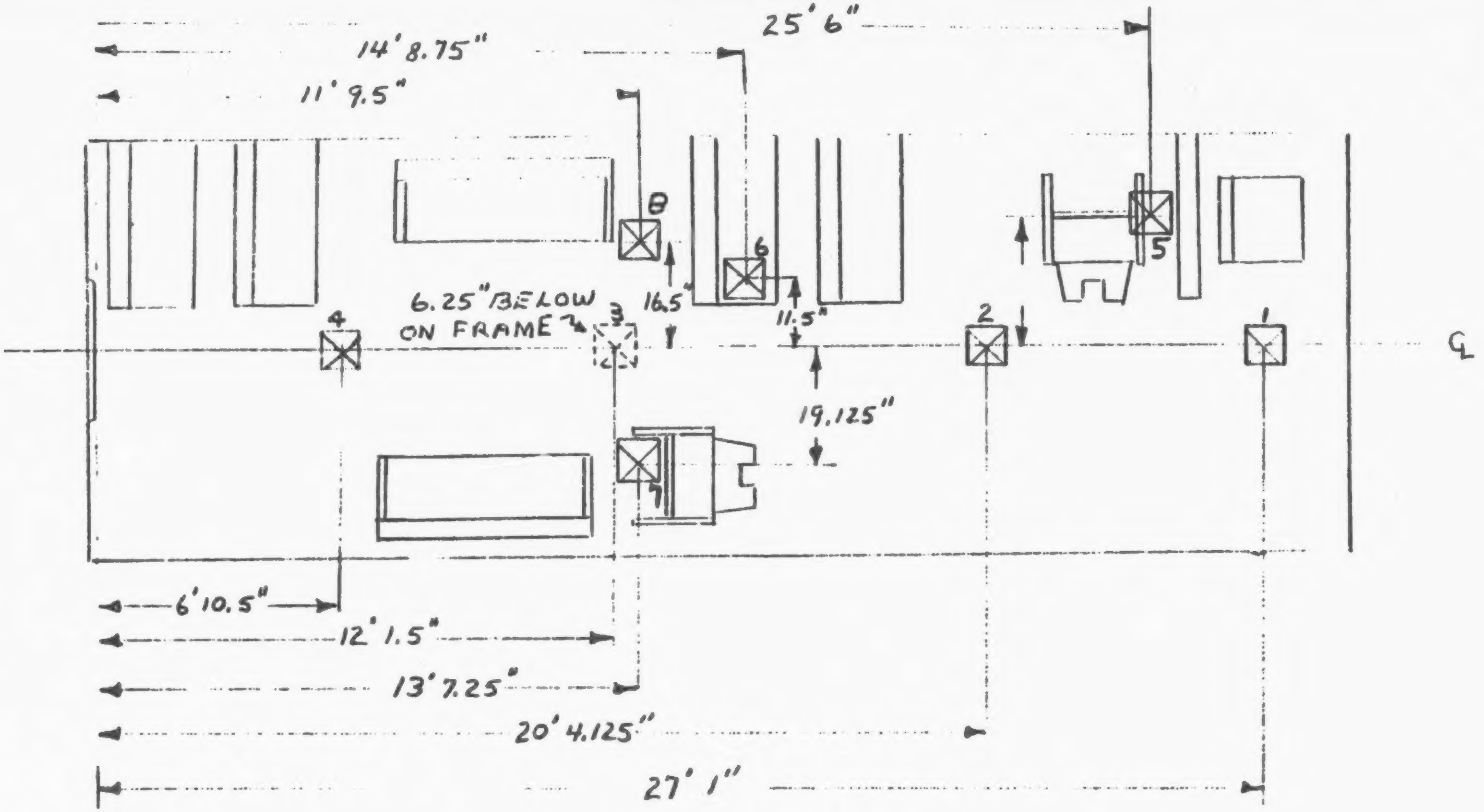
Figure 15 PRE- AND POST-TEST NO. 3, DAMAGE TO MOVING BARRIER


IMPACT
℄
20'
2'
C
B
A
48"
34"
22"
C.G.
260
10
9
8
7
6
5
4
3
2
1

STATION	1	2	3	4	5	6	7	8	9	10
A	1/4	1 7/8	4 5/8	7	7 5/8	–	–	–	–	0
B	0	3/8	1 1/2	4 7/8	5 3/8	–	–	–	3/16	0
C	1/8	1/8	1/4	1 3/4	2 1/8	1 1/4	3/4	3/8	1/8	0

DIMENSIONS LISTED ARE FROM POINTS SHOWN TO A REFERENCE PLAIN LOCATED PARALLEL TO THE UNDAMAGED SIDE SURFACE OF BUS. ALL DIMENSIONS ARE IN INCHES.

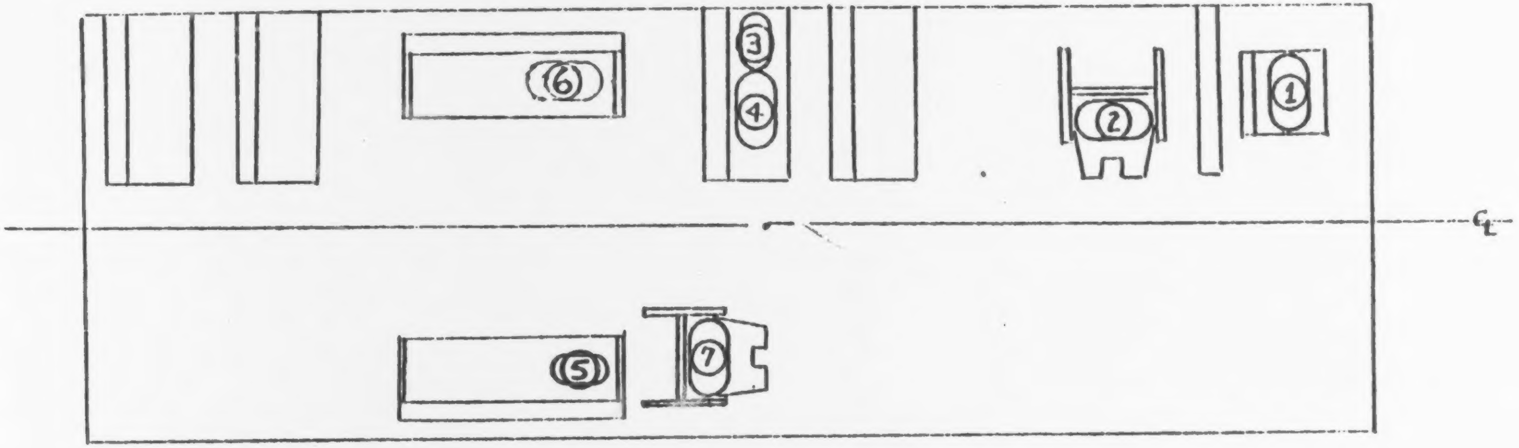
Figure 16 SIDE INTRUSION MEASUREMENTS (CRUSH)


25'6"
14'8.75"
11'9.5"
8
6
5
16.5"
11.5"
6.25" BELOW ON FRAME
4
3
2
1
℄
19.125"
7
6'10.5"
12'1.5"
13'7.25"
20'4.125"
27'1"

ACCEL. NO.	ACCEL. COMP.		
1	X	Y	Z
2	X	Y	Z
3	X	Y	Z
4	X	Y	Z
5	X		Z
6	X		Z
7	X	Y	
8	X	Y	

Figure 17 ACCLLEROMETER LOCATION AND COMPONENTS RECORDED FOR TEST NO. 3

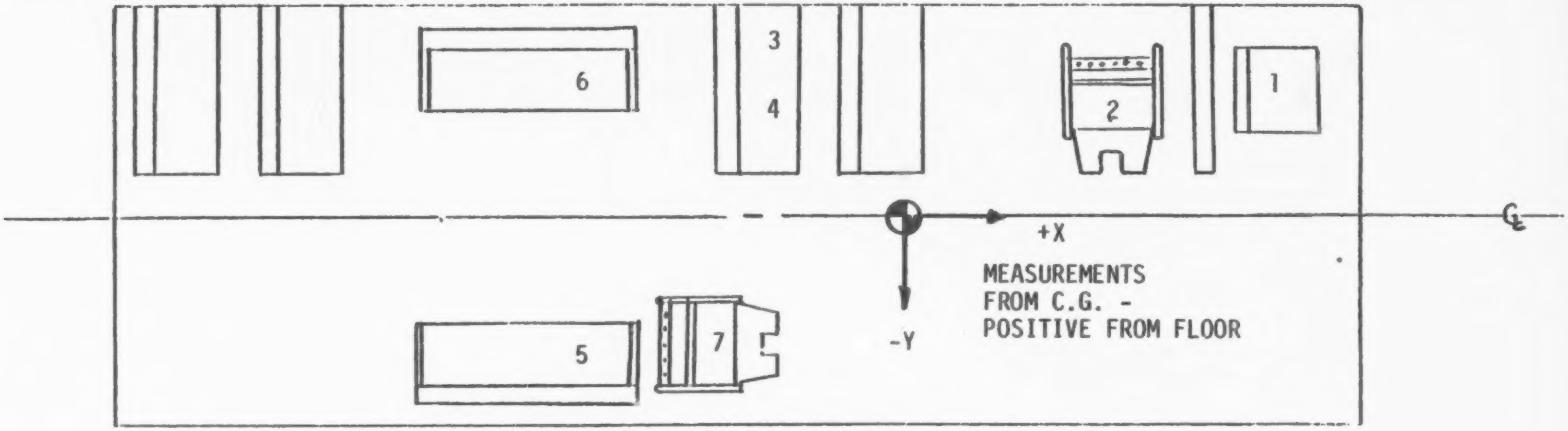
6440-V-2



DUMMY POS. & TYPE	TRANSDUCERS			
	HEAD (ACCEL.)	CHEST (ACCEL.)	FEMUR (LOADS)	BELTS (LOADS)
(1) 50%	X, Y, Z	X, Y, Z	--	RIGHT, LEFT
(2) 50%	X, Y, Z	X, Y, Z	--	RIGHT, LEFT
(3) 6-YR OLD	X, Y, Z	X, Y, Z	--	--
(4) 50%	X, Y, Z	X, Y, Z	RIGHT, LEFT	--
(5) 6-YR OLD	X, Y, Z	X, Y, Z	--	--
(6) 50%	X, Y, Z	X, Y, Z	RIGHT, LEFT	--
(7) 50%	X, Y, Z	X, Y, Z	--	RIGHT, LEFT

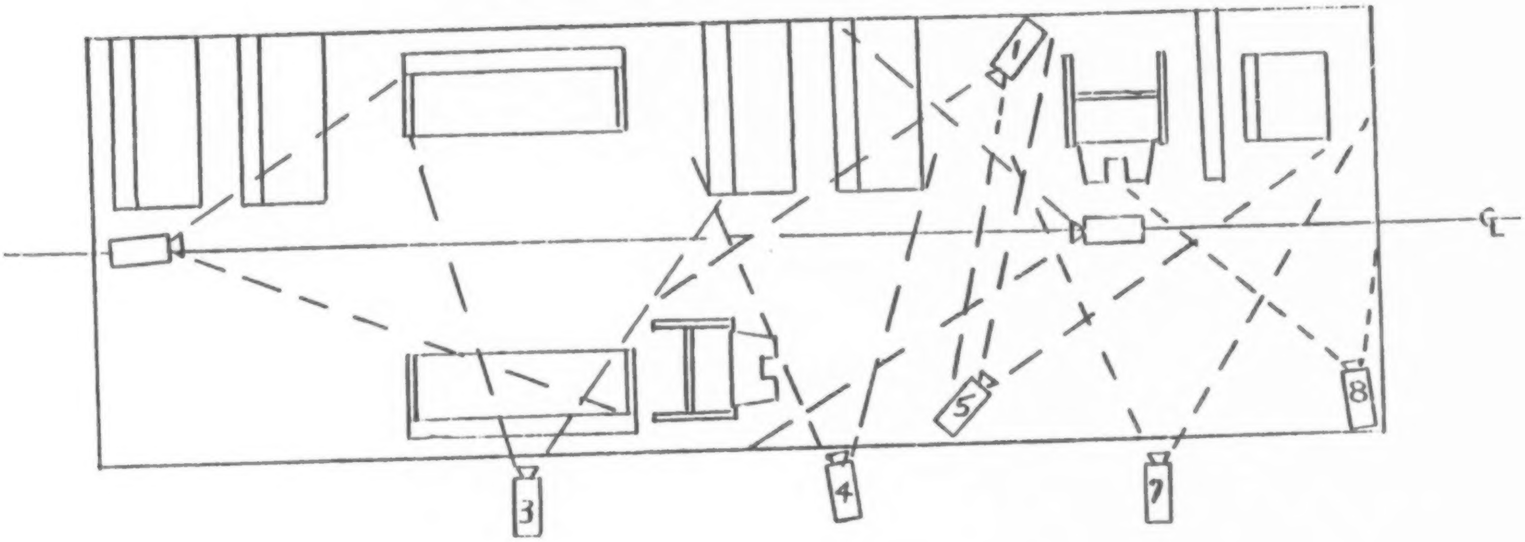
6440-V-2

Figure 18 DUMMY LOCATIONS AND TRANSDUCER SIGNALS RECORDED FOR TEST NO. 3



DUMMY LOCATION		HEAD TARGET			HIP TARGET			KNEE TARGET		
		X	Y	Z	X	Y	Z	X	Y	Z
POS. 1	PRE	96	16	45	99	11	18	115.5	12	20
	POST	97.5	14	44.5	101	9.5	17.5	116.5	8	19
POS. 2	PRE	59.5	31	48	54.5	29	21	55.5	11	24
	POST	65.5	29	48	59.0	28	21	61	12	18
POS. 3	PRE	-48.5	38	37	-48	34	19	-39	35	18
	POST	-54	31.5	28.5	-23	31	20	-30	30	14.5
POS. 4	PRE	-45.5	22	45	-47.5	17	19	-34	16	19
	POST	-44	-10.2	12.5	-50.5	16.5	17	-32	14	11
POS. 5	PRE	-86.5	-39	50	-84	-22	22	-84.5	-24.5	23.25
	POST	-122	17	7	-113	-7.5	6	-97	0	0
POS. 6	PRE	-95	34	45.5	-97	31.5	21.5	-96	14.5	20
	POST	-83	-29	48	-120	21	21	-113	24	22.5
POS. 7	PRE	-43.5	-37.5	45.5	-39.5	-32	20	-23.5	-21	19
	POST	-42	-10.5	4.5	-45.3	-5.5	5.5	-29.5	-5.5	3

Figure 19 PRE- AND POST-TEST NO. 3 - DUMMY LOCATIONS

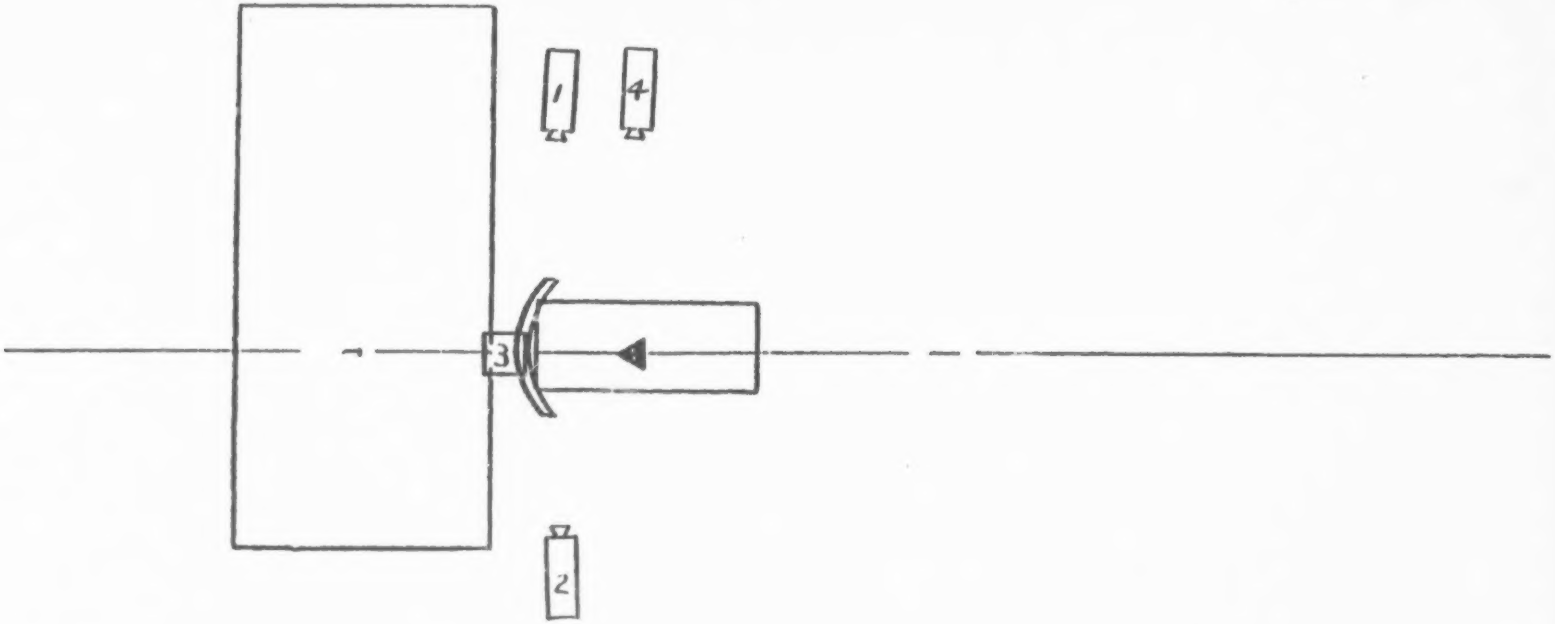


LOC. NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)	FIELD OF VIEW
1	AS SHOWN	STALEX	8	*	AS SHOWN
2	AS SHOWN	STALEX	8	*	AS SHOWN
3	AS SHOWN	STALEX	8	*	AS SHOWN
4	AS SHOWN	PHOTONSONICS	8	400	AS SHOWN
5	AS SHOWN	STALEX	8	1200	AS SHOWN
6	AS SHOWN	STALEX	8	800	AS SHOWN
7	AS SHOWN	PHOTOSONICS	8	400	AS SHOWN
8	AS SHOWN	STALEX	8	1000	AS SHOWN

*LOST TIMING

Figure 20 ON-BOARD CAMERA COVERAGE FOR TEST NO. 3

6440-V-2



LOC. NO.	LOCATION	FIELD OF VIEW	LENS (mm)	SPEED (fps)
1	SOUTH CLOSE	IMPACT POINT	13	750
2	NORTH CLOSE	IMPACT POINT	13	650
3	TOWER OVERALL	IMPACT POINT	13	325
4	SOUTH PAN	REAL PAN OF EVENT	--	24

Figure 21 OFF-BOARD CAMERA COVERAGE FOR TEST NO. 3

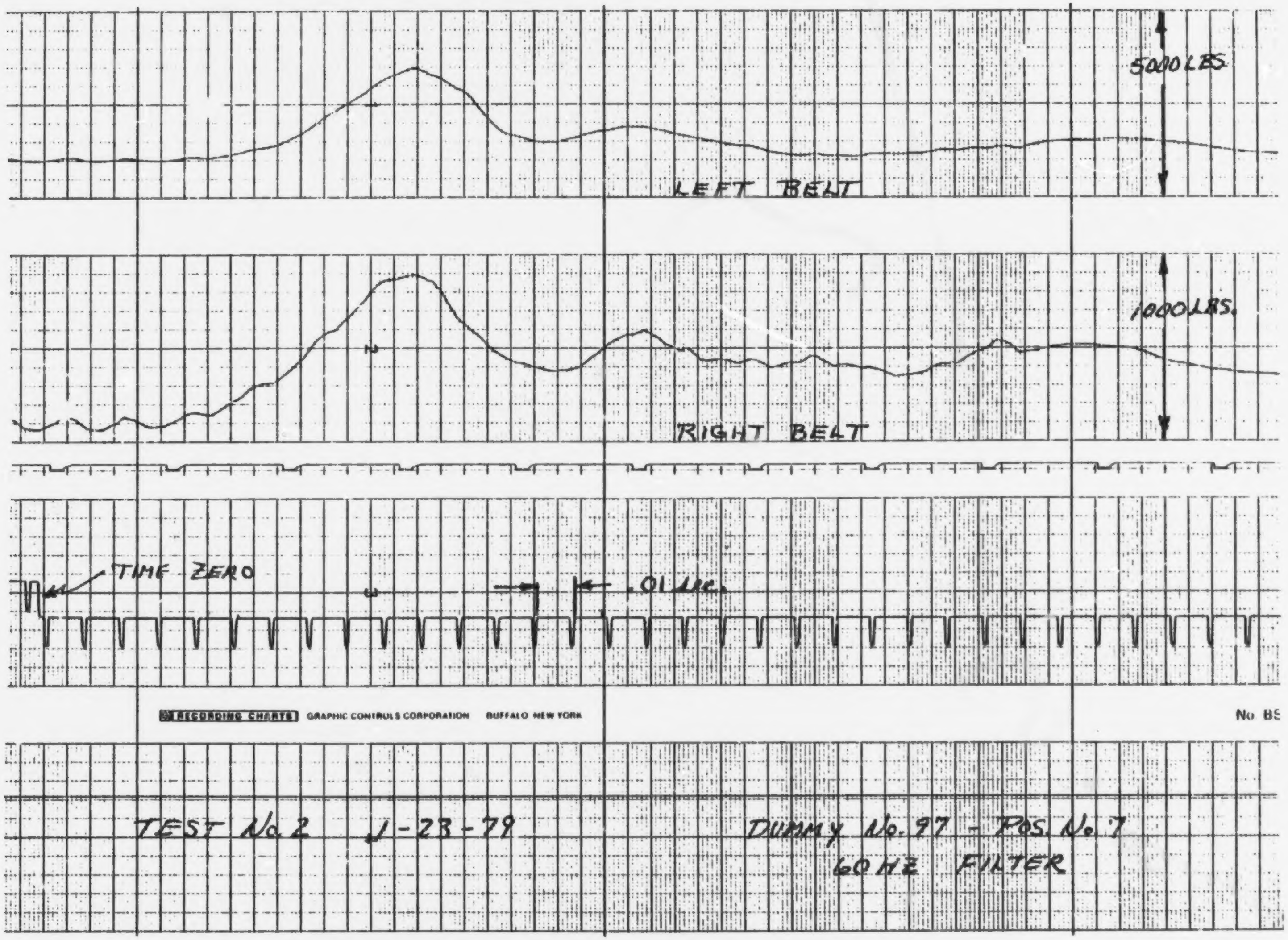
6440-V-2

APPENDIX 1

TEST NO. 2 DATA

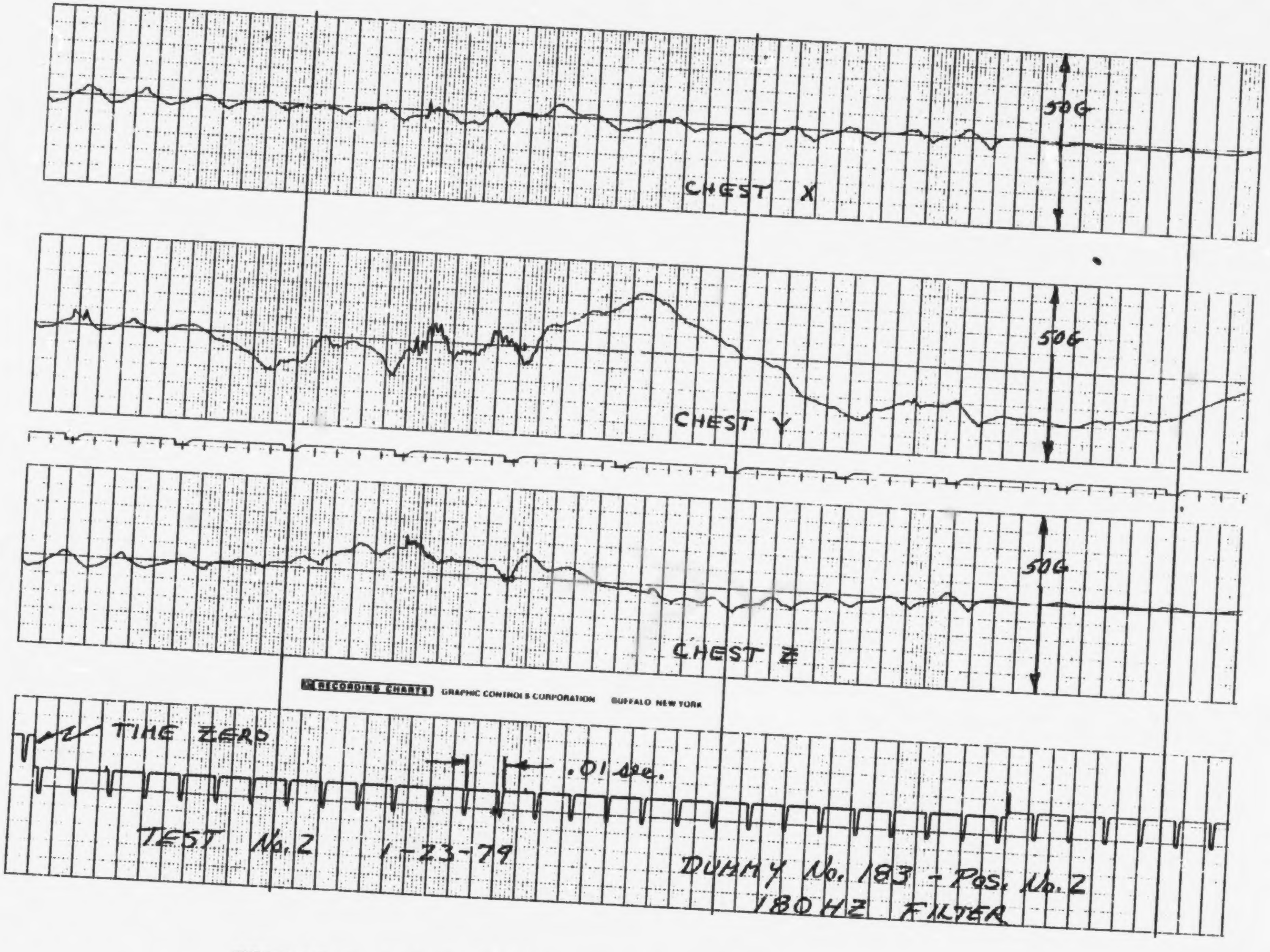
	FILTER CHANNEL CLASS
VEHICLE DATA	60
HEAD ACCELERATIONS	1000
CHEST ACCELERATIONS	180
BELT LOADS	60

66



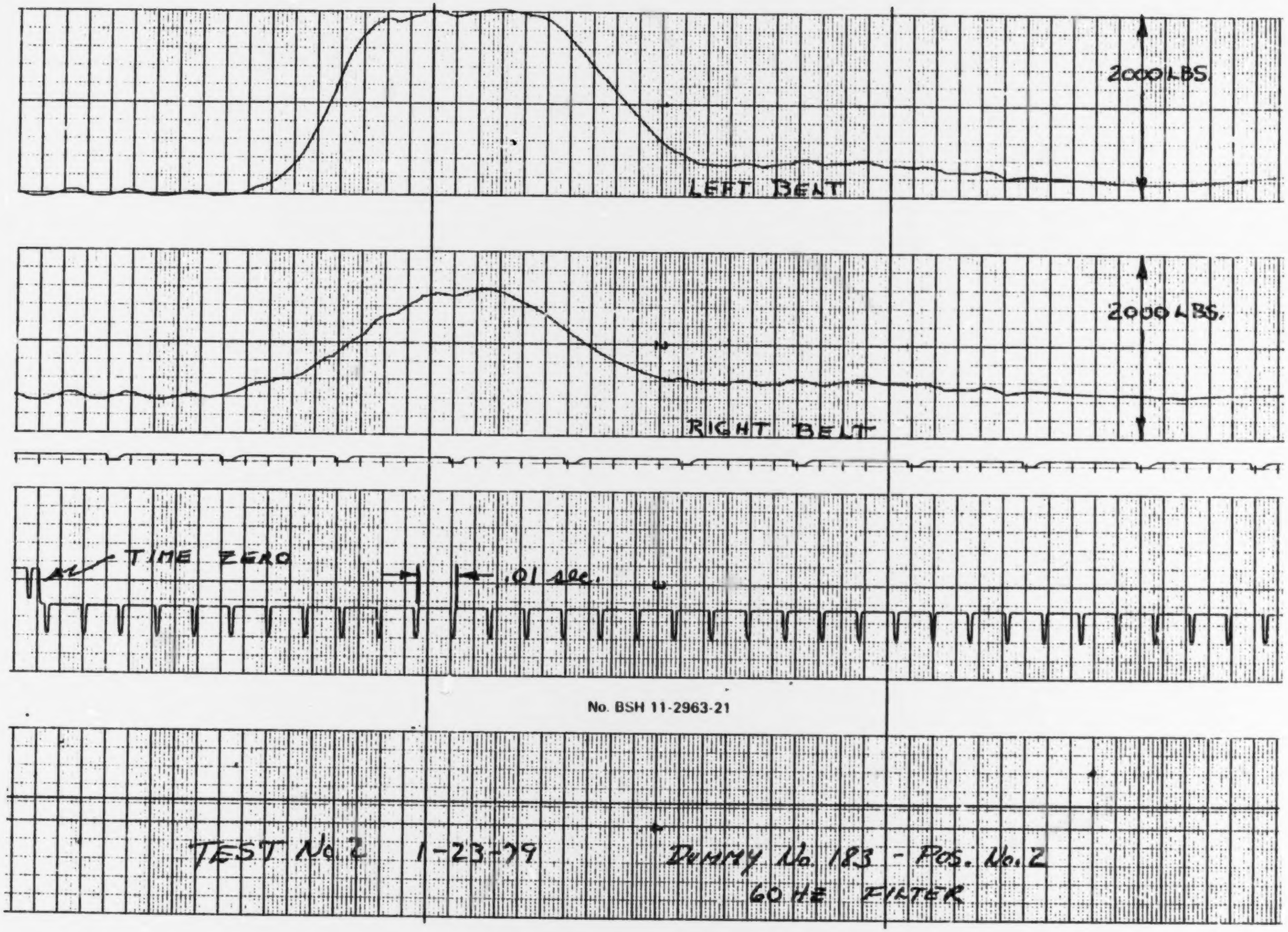
TEST NO. 2 1-23-79 DUMMY NO. 97 – POS. NO. 7 60 Hz FILTER

6440-V-2



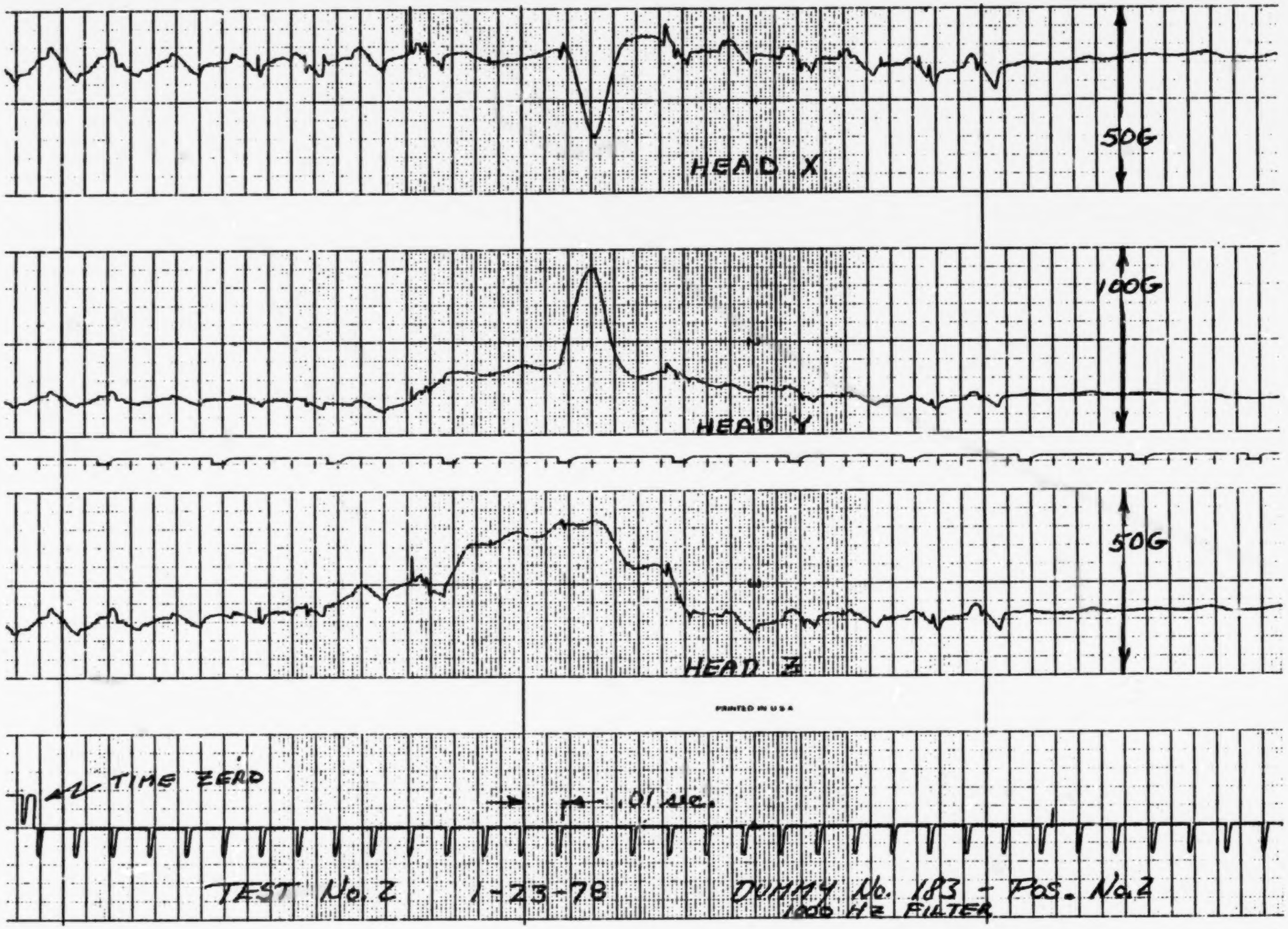
TEST NO. 2 1-23-79 DUMMY NO. 183 – POS. NO. 2 180 Hz FILTER

68



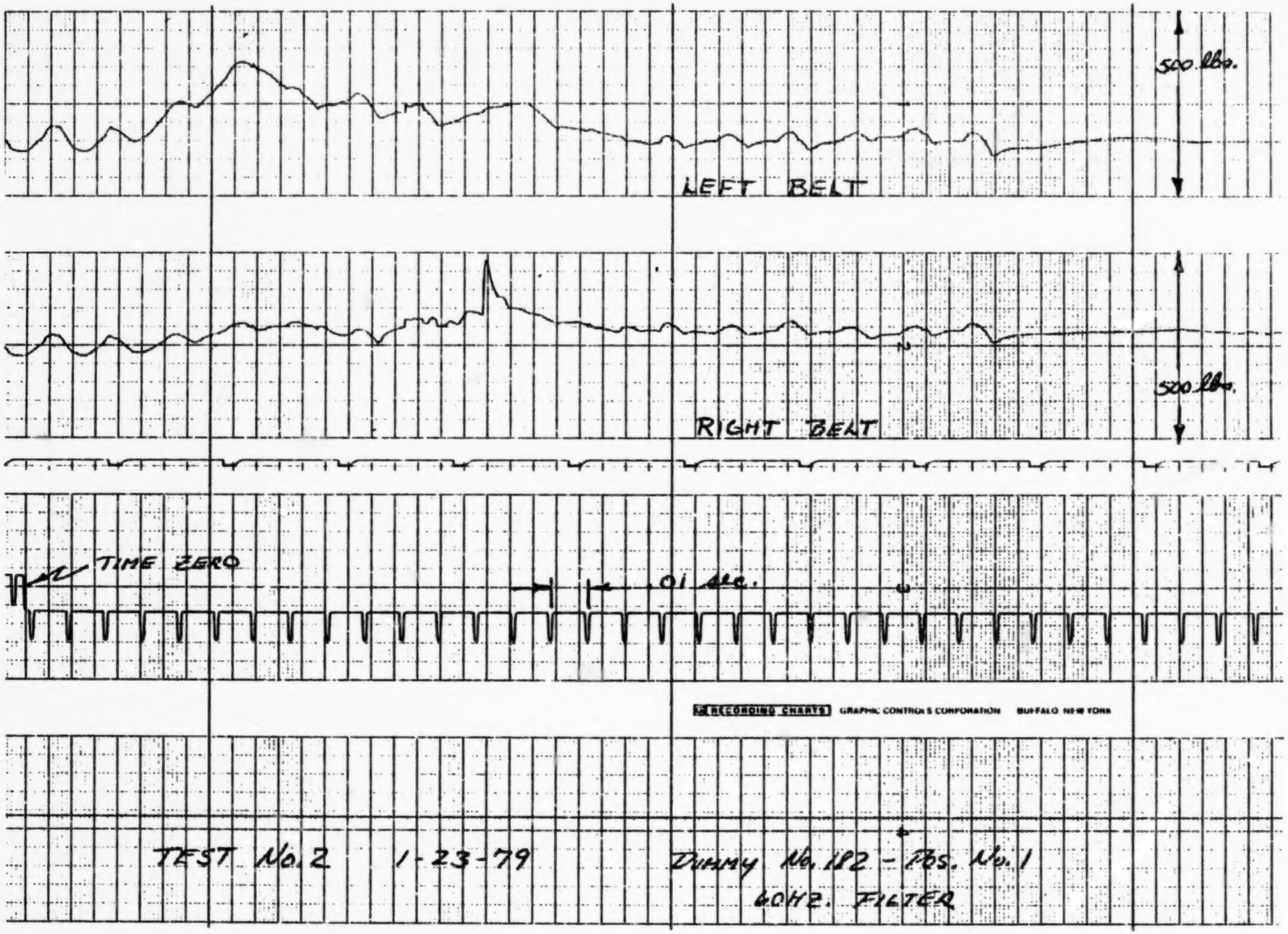
TEST NO. 2 1-23-79 DUMMY NO. 183 – POS. NO. 2 60 Hz FILTER

6440-V-2



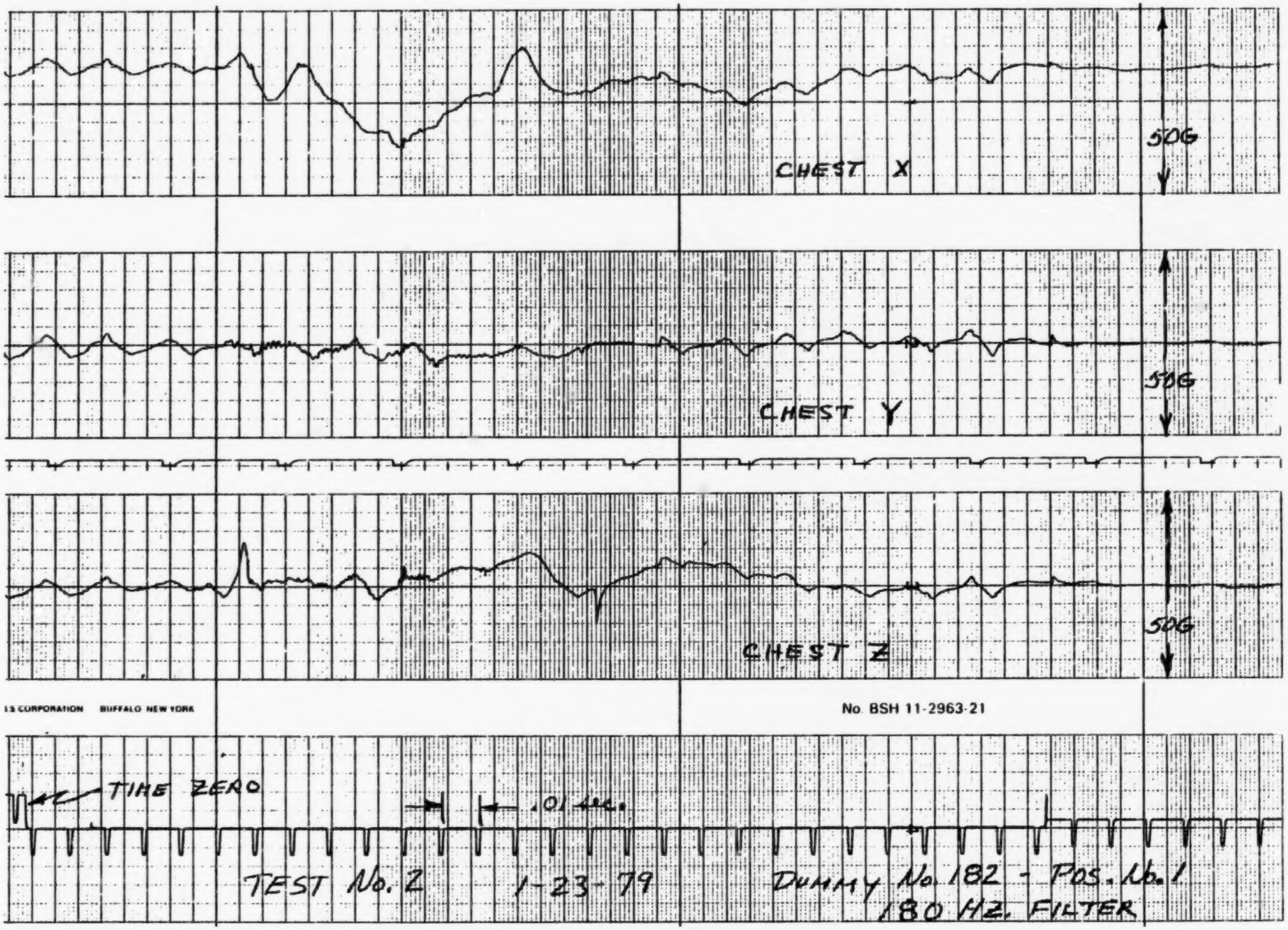
TEST NO. 2 1-23-79 DUMMY NO. 183 – POS. NO. 2 100 Hz FILTER

6440-V-2



TEST NO. 2 1-23-79 DUMMY NO. 182 – POS. NO. 1 60 Hz FILTER

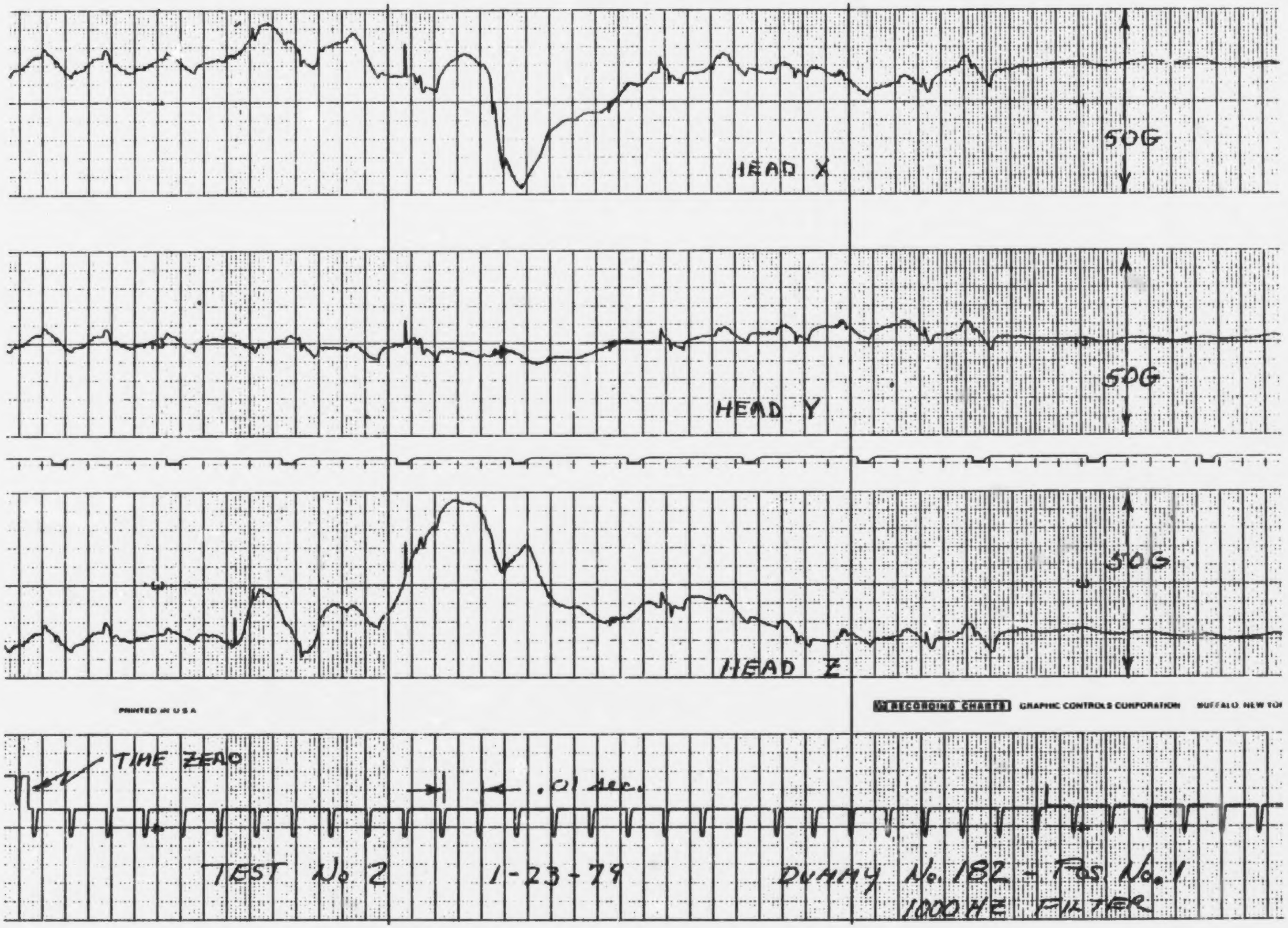
6440-V-2



TEST NO. 2 1-23-79 DUMMY NO. 182 – POS. NO. 1 180 Hz FILTER

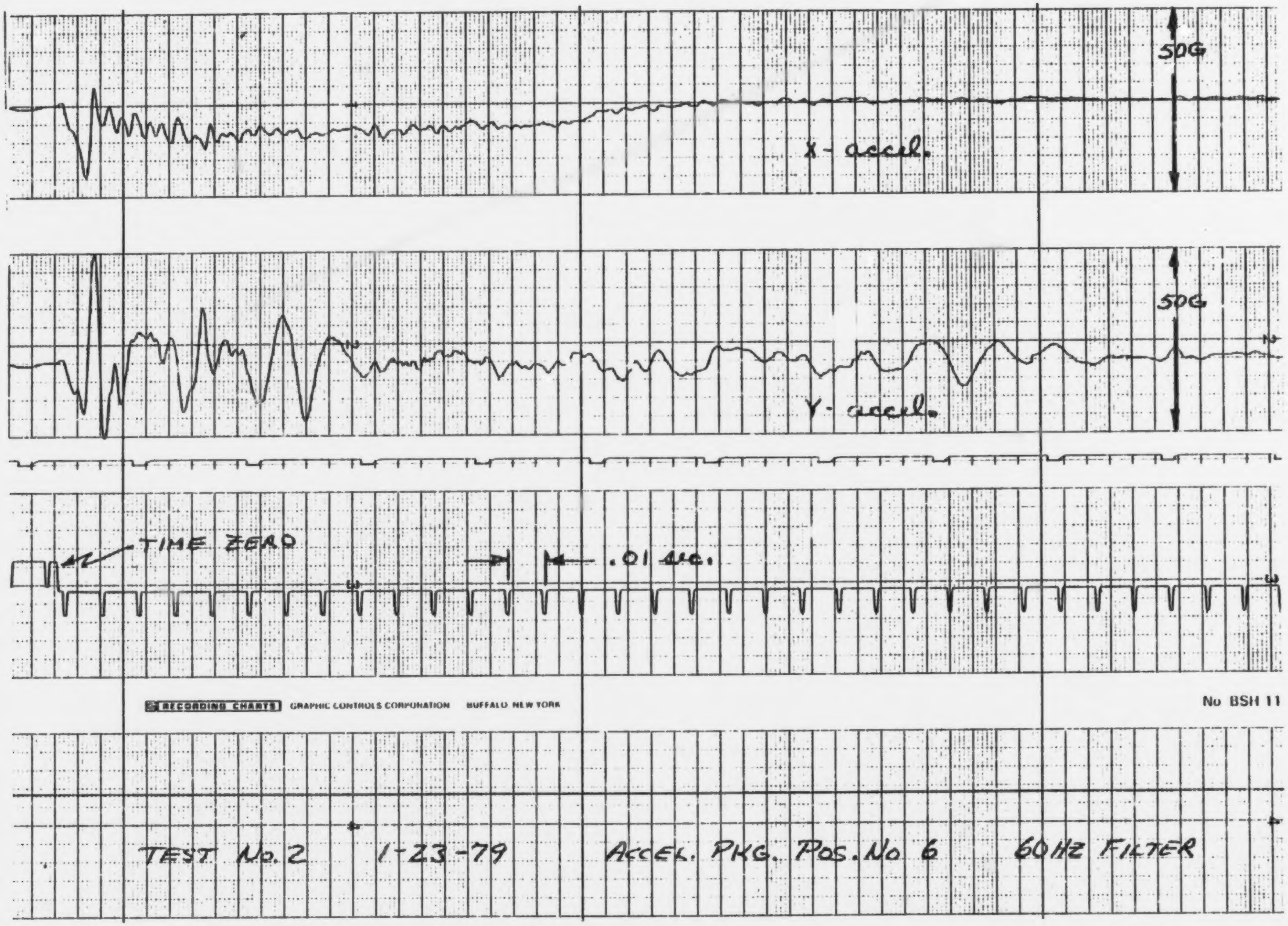
6440-V-2

72



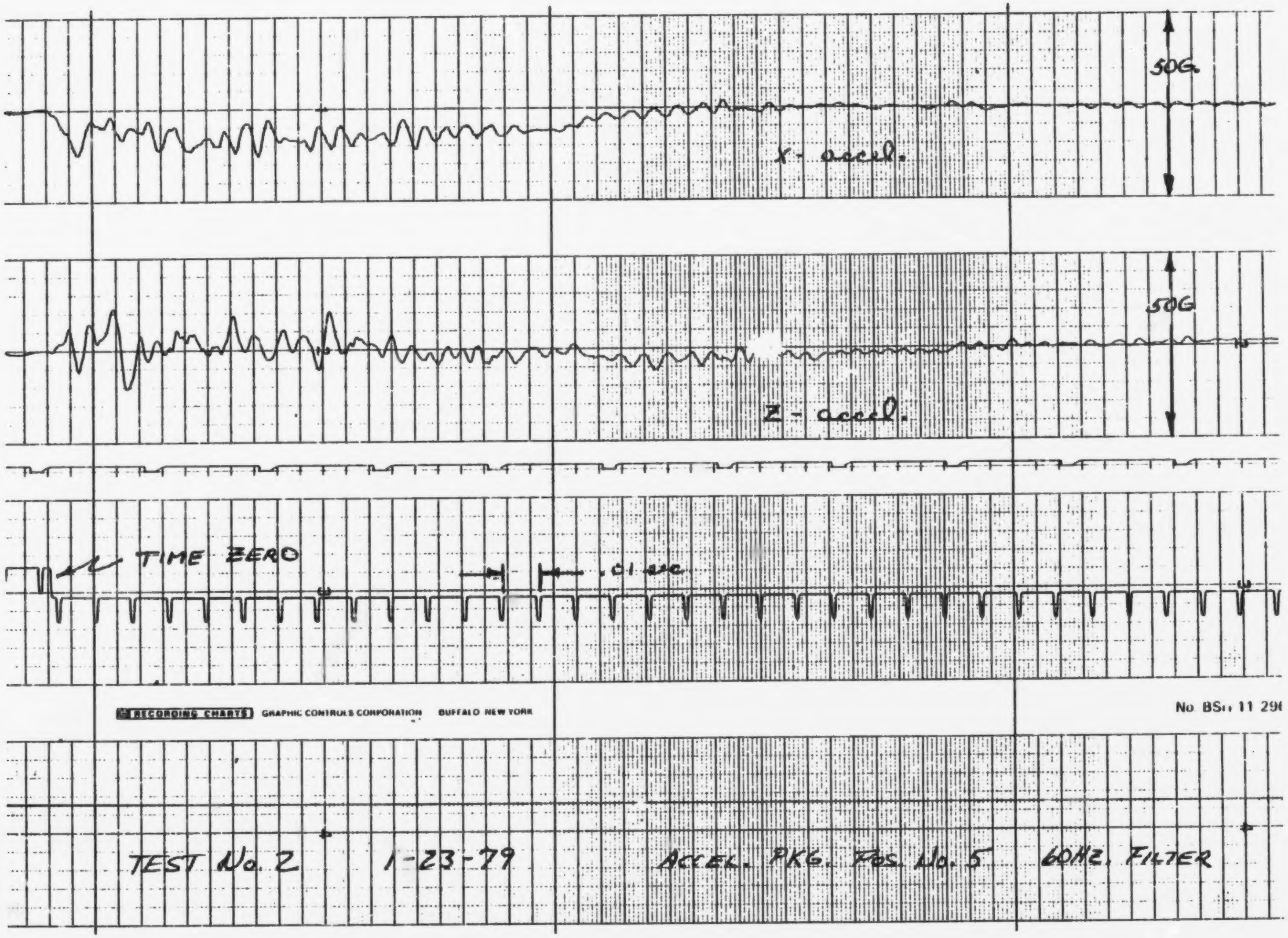
TEST NO. 2 1-23-79 DUMMY NO. 182 – POS. NO. 1 1000 Hz FILTER

6440-V-2

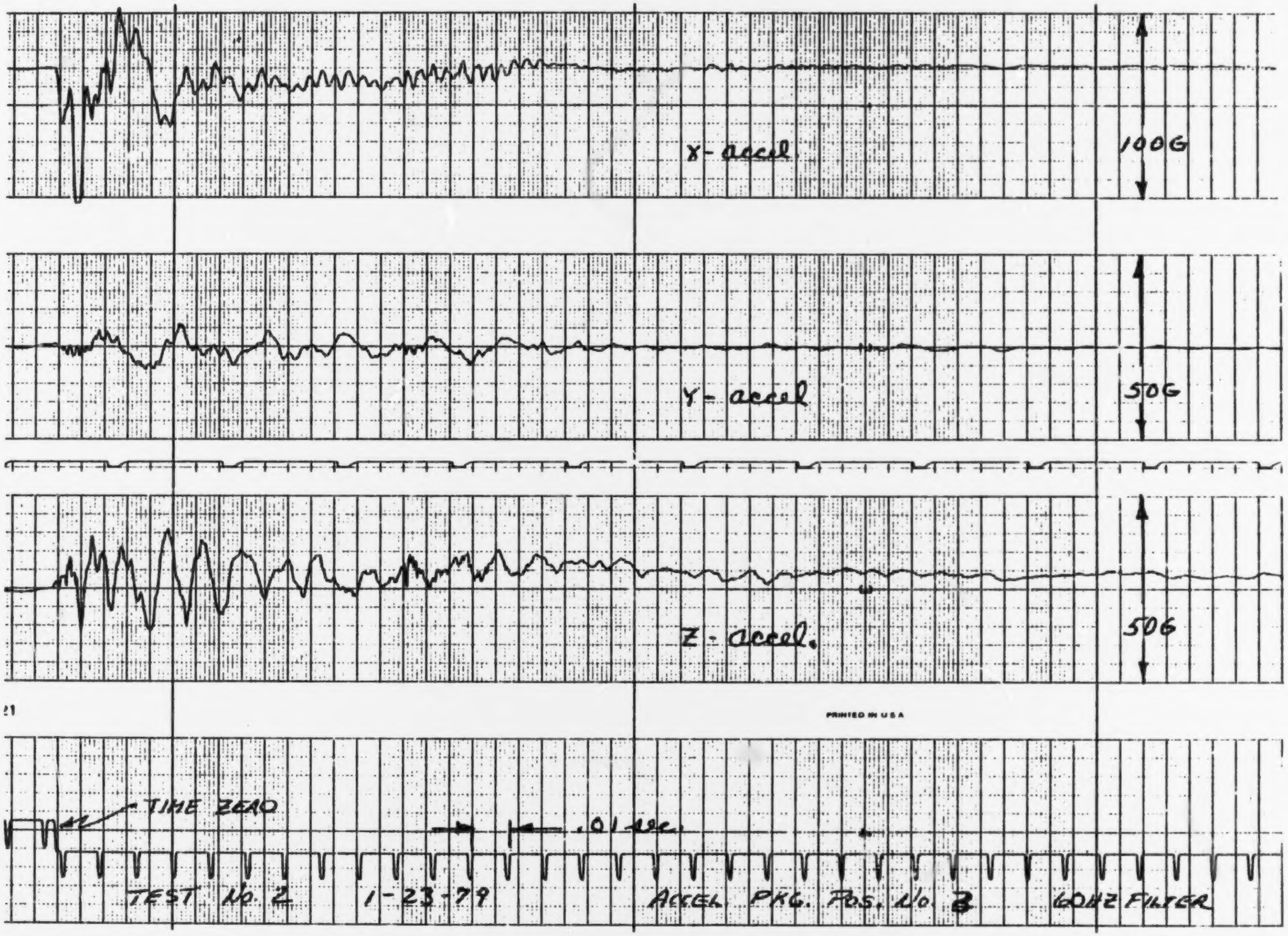


TEST NO. 2 1-23-79 ACCEL. PKG. POS. NO. 6 60 Hz FILTER

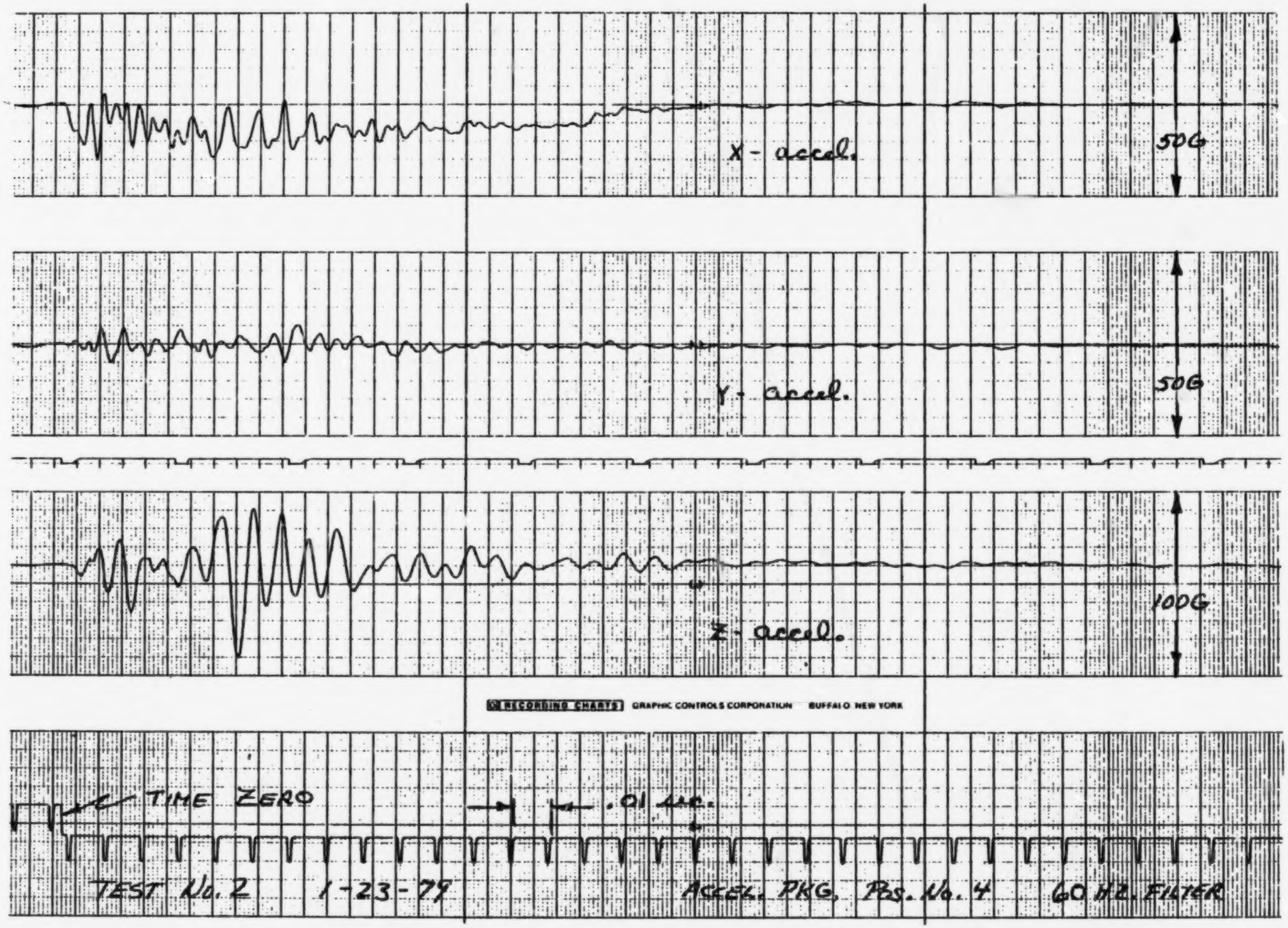
6440-V-2



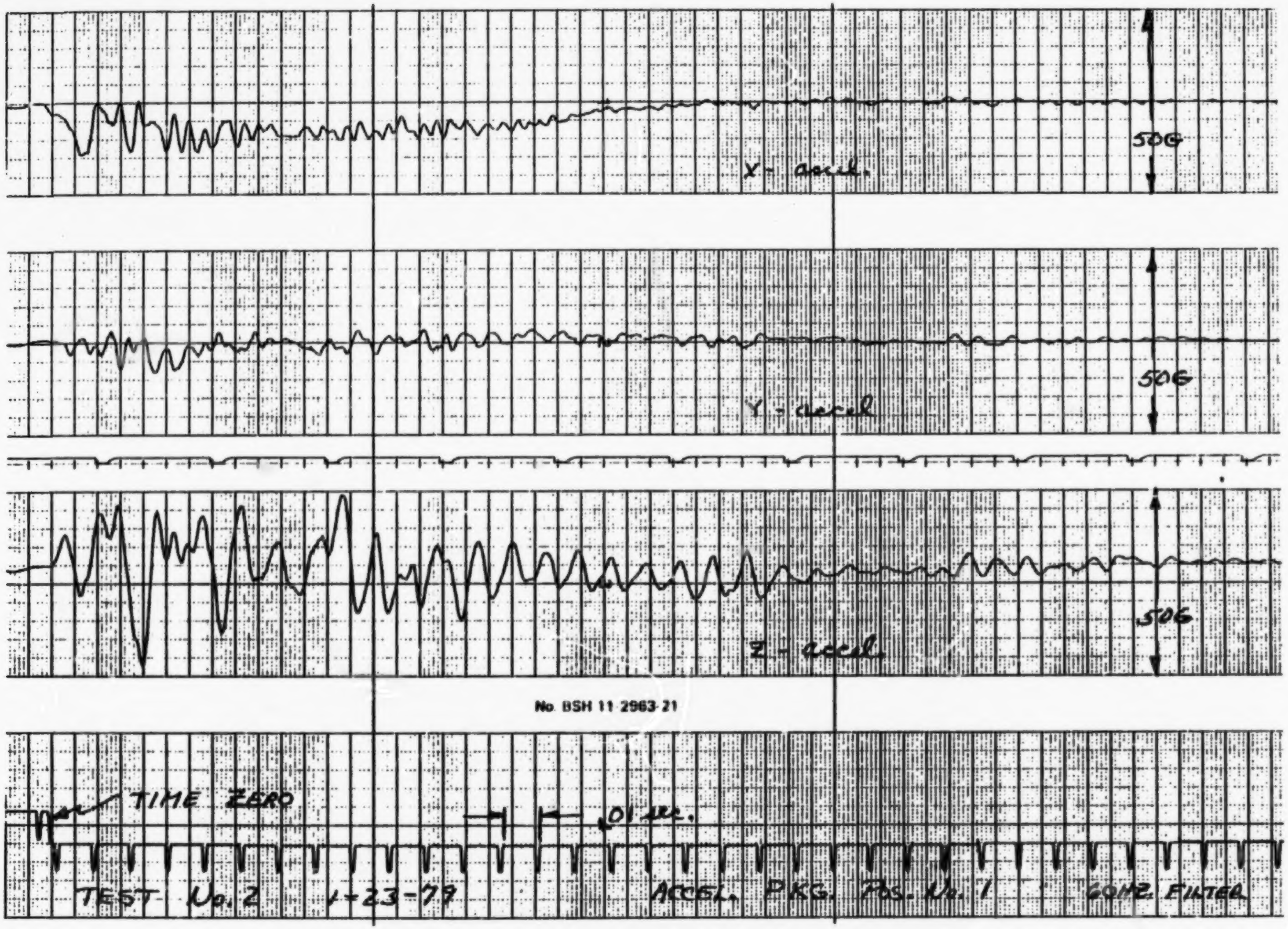
TEST NO. 2 1-23-79 ACCEL. PKG. POS. NO. 5 60 Hz FILTER



TEST NO. 2   1-23-79   ACCEL. PKG. POS. NO. 3   60 Hz FILTER

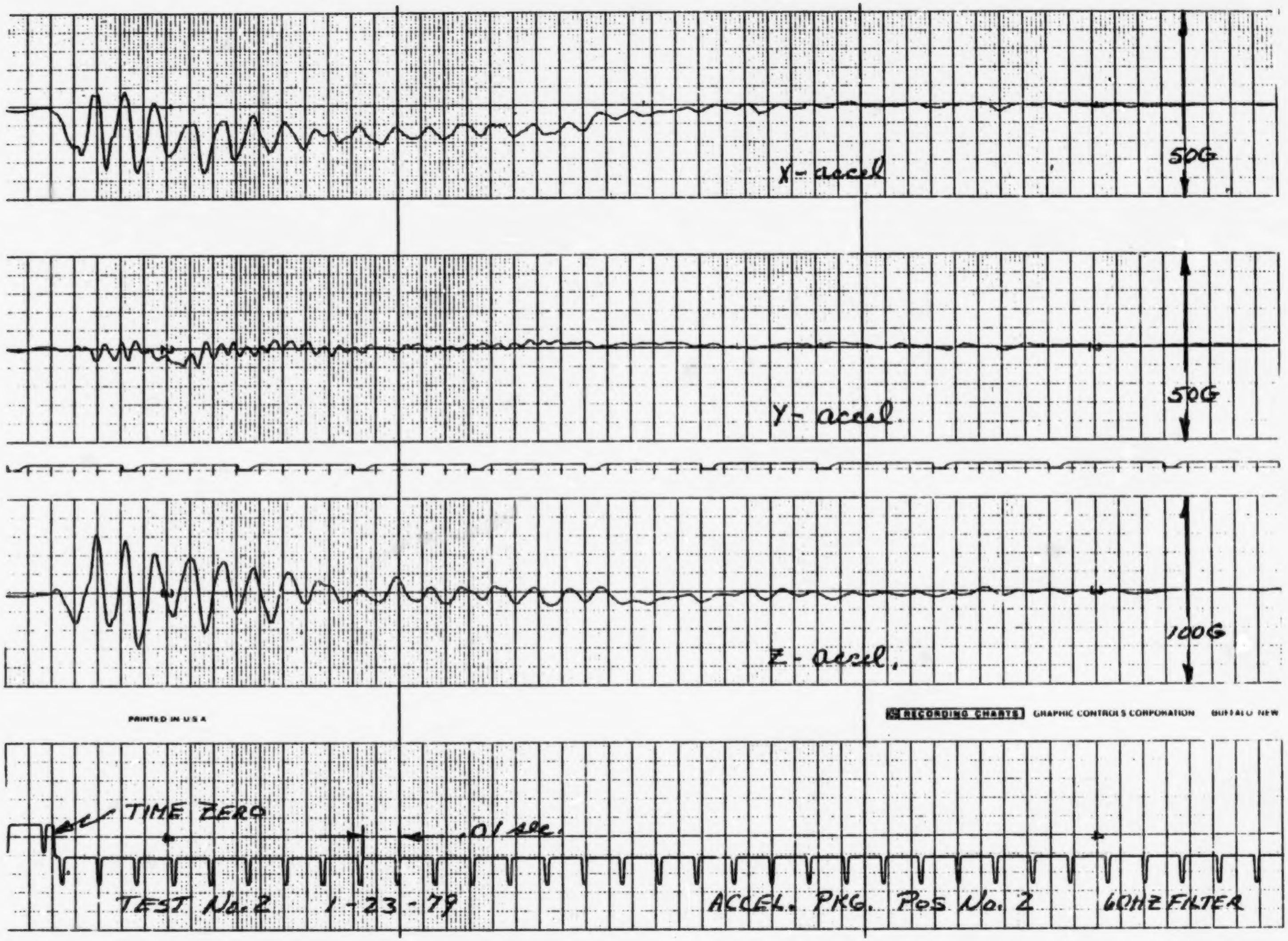


TEST NO. 2 1-23-79 ACCEL. PKG. POS. NO. 4 60 Hz FILTER



TEST NO. 2 1-23-79 ACCEL. PKG. POS. NO. 1 60 Hz FILTER

6440-V-2



6440-V-2

TEST NO. 2 1-23-79 ACCEL. PKG. POS. NO. 2 60 Hz FILTER

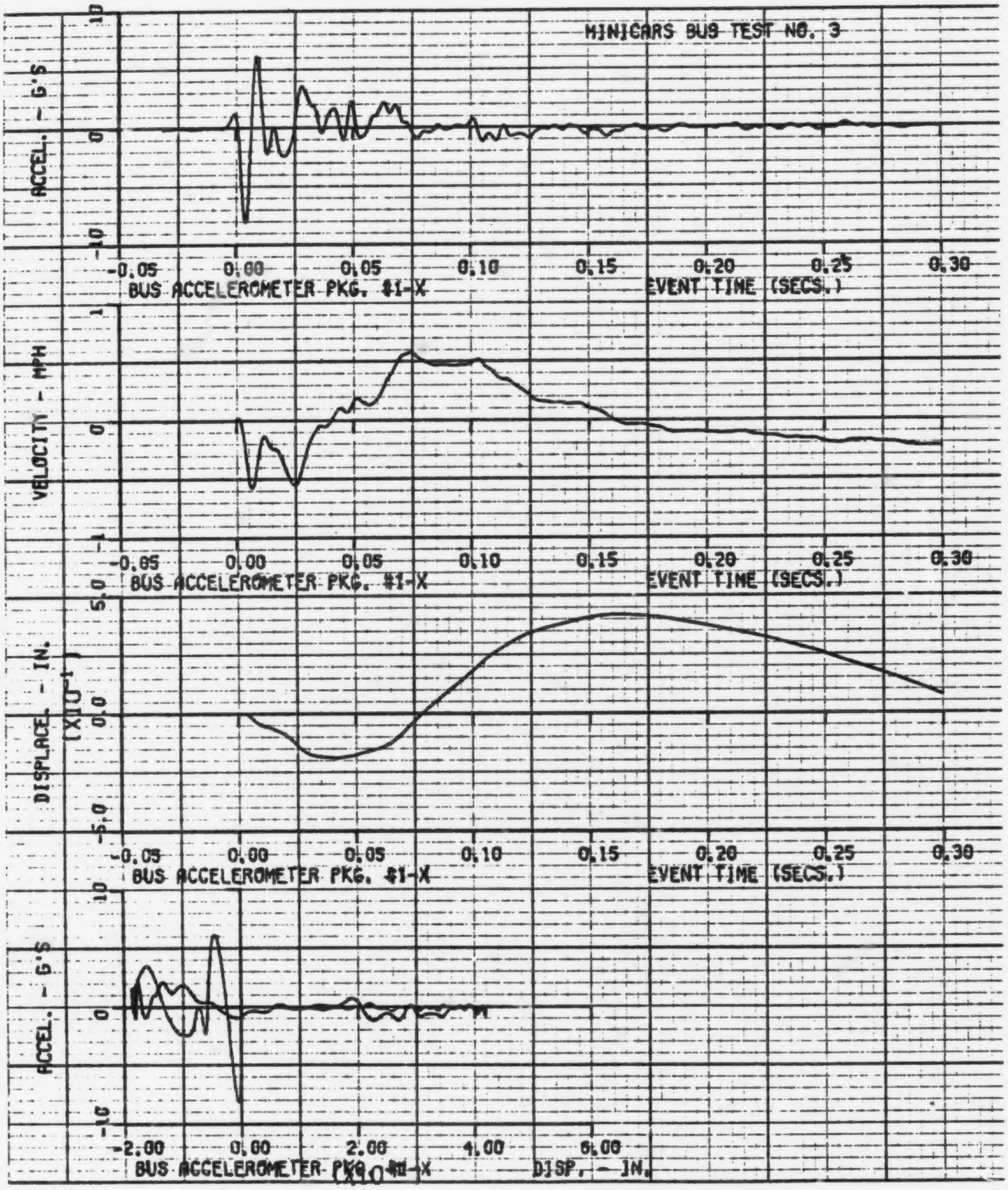
APPENDIX 2

TEST NO. 3 DATA

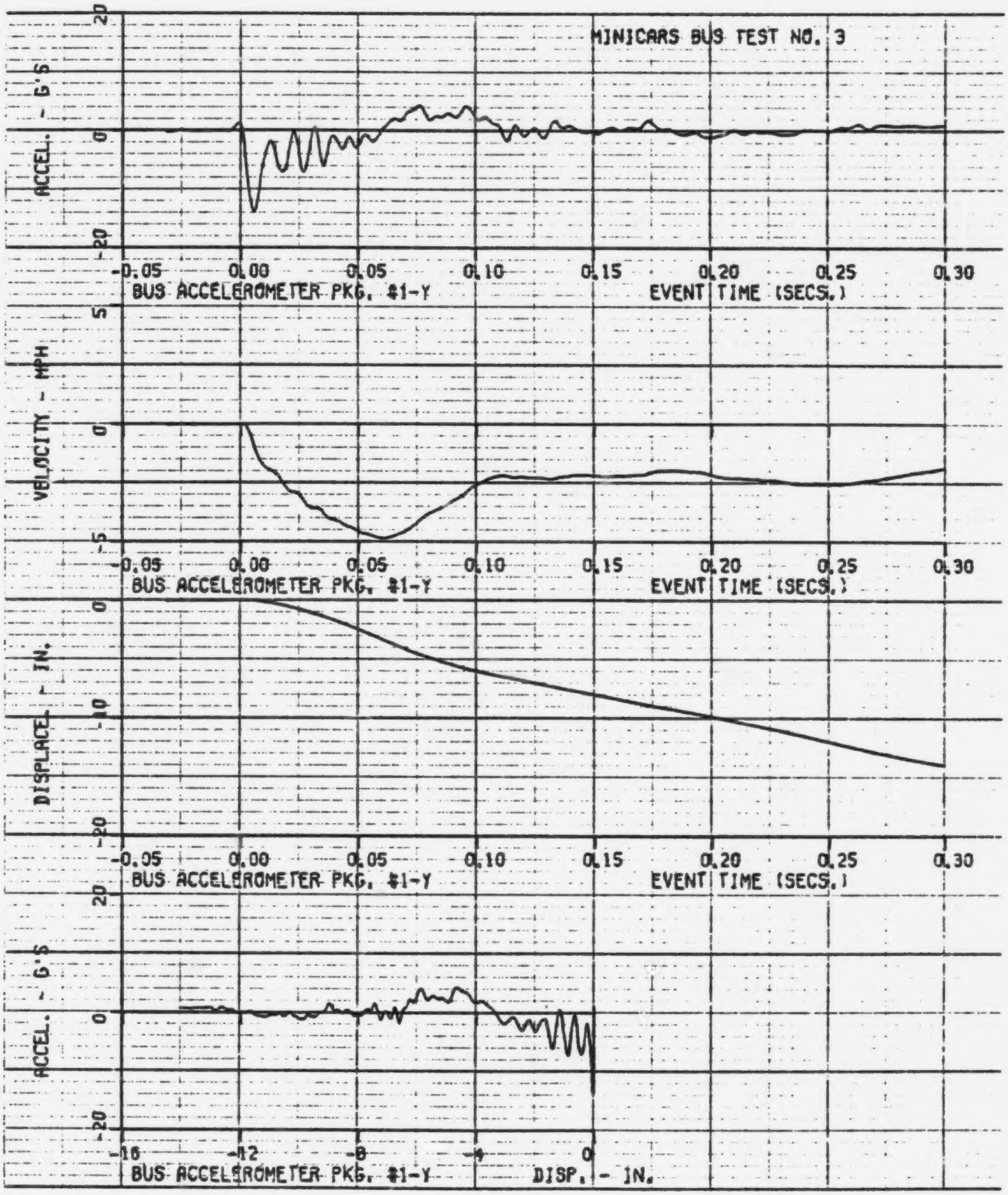
BLANK PAGE

BUS ACCELERATION

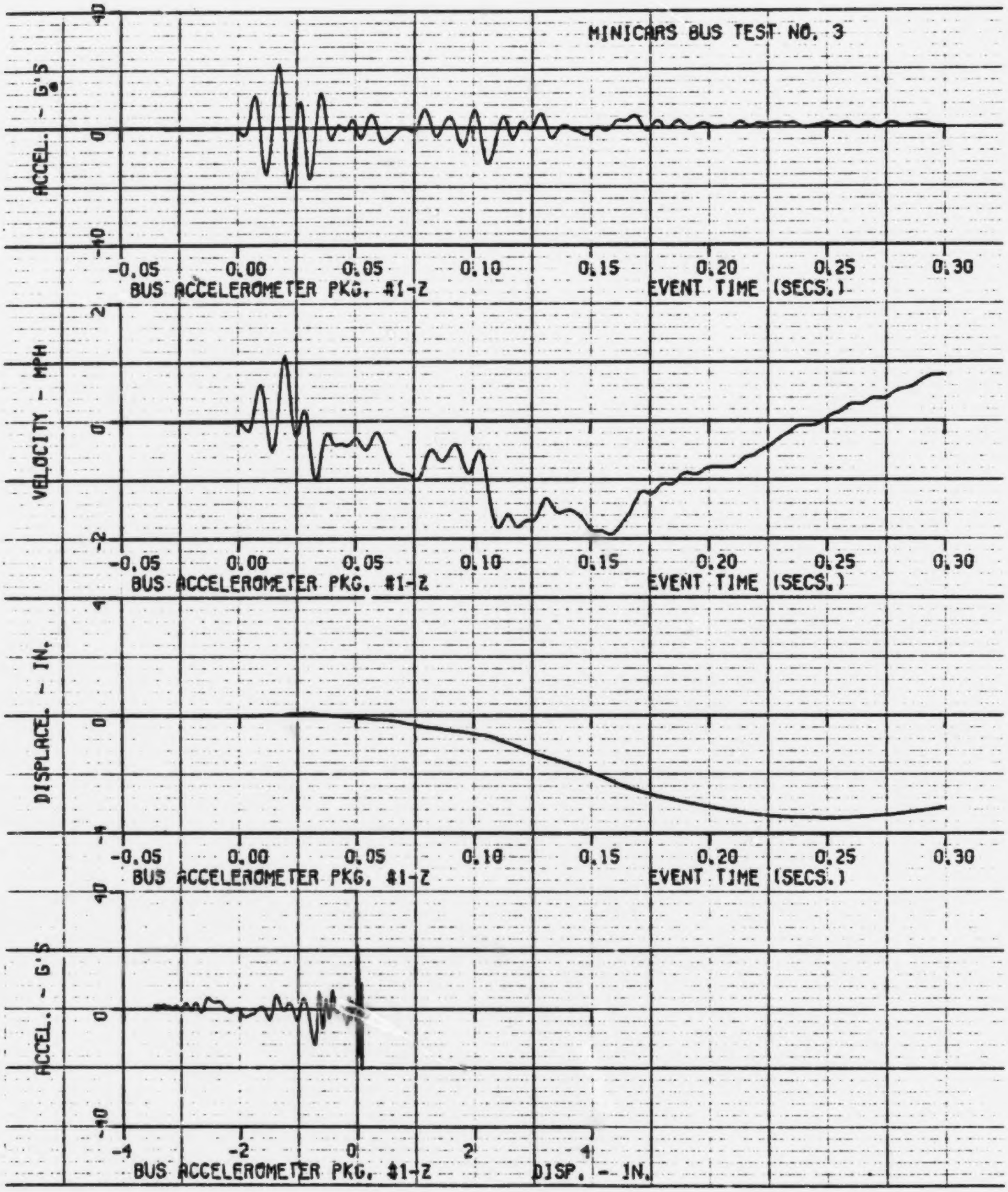
FILTER CHANNEL CLASS 60


MINICARS BUS TEST NO. 3
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-X
EVENT TIME (SECS.)
VELOCITY - MPH
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-X
EVENT TIME (SECS.)
DISPLACE. - IN.
(X10⁻¹)
5.0
0.0
-5.0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-X
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-2.00
0.00
2.00
4.00
6.00
BUS ACCELEROMETER PKG. #1-X
(X10⁻¹)
DISP. - IN.

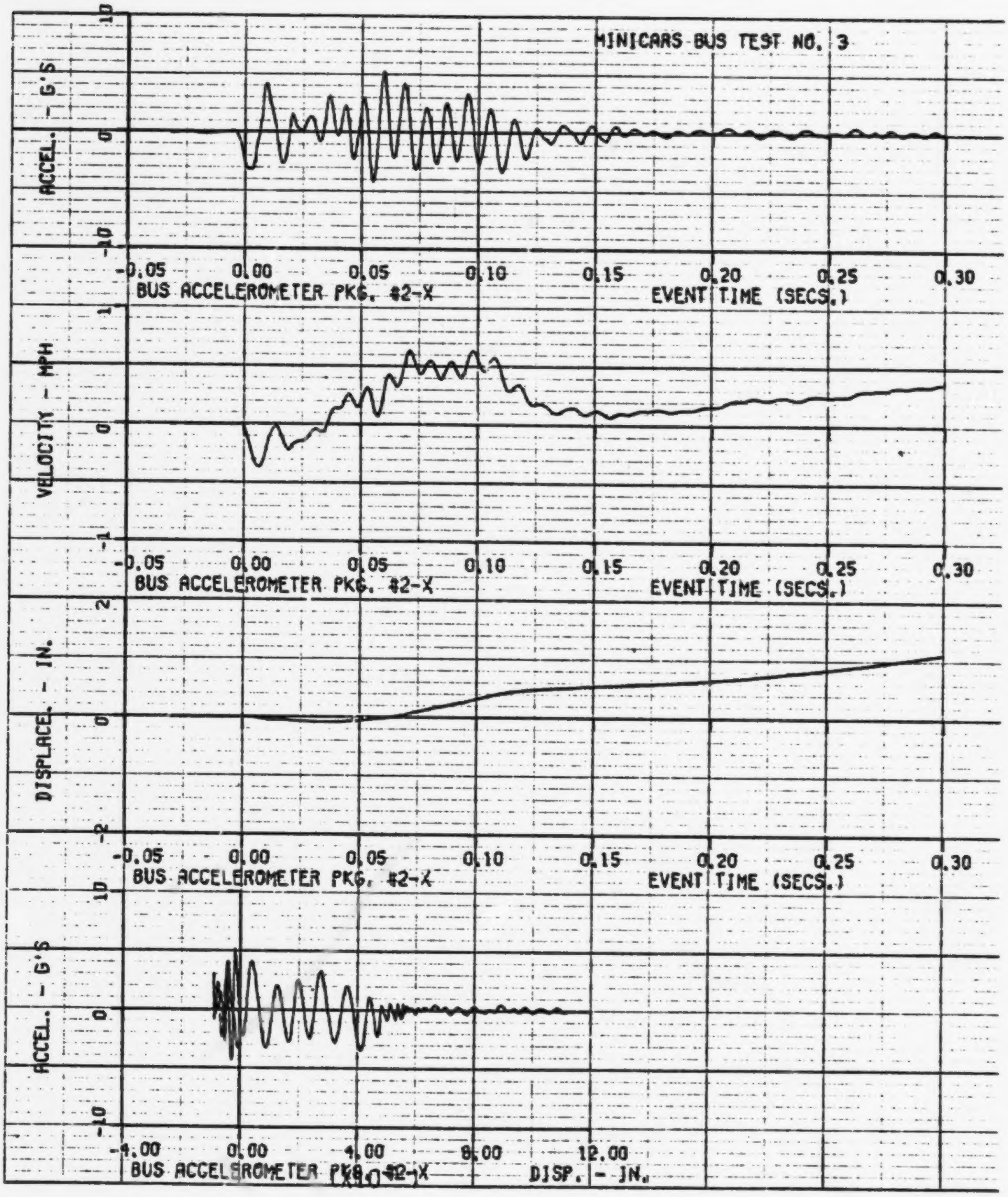
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Y
EVENT TIME (SECS.)
VELOCITY - MPH
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Y
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-10
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Y
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-16
-12
-8
-4
0
BUS ACCELEROMETER PKG. #1-Y
DISP. - IN.

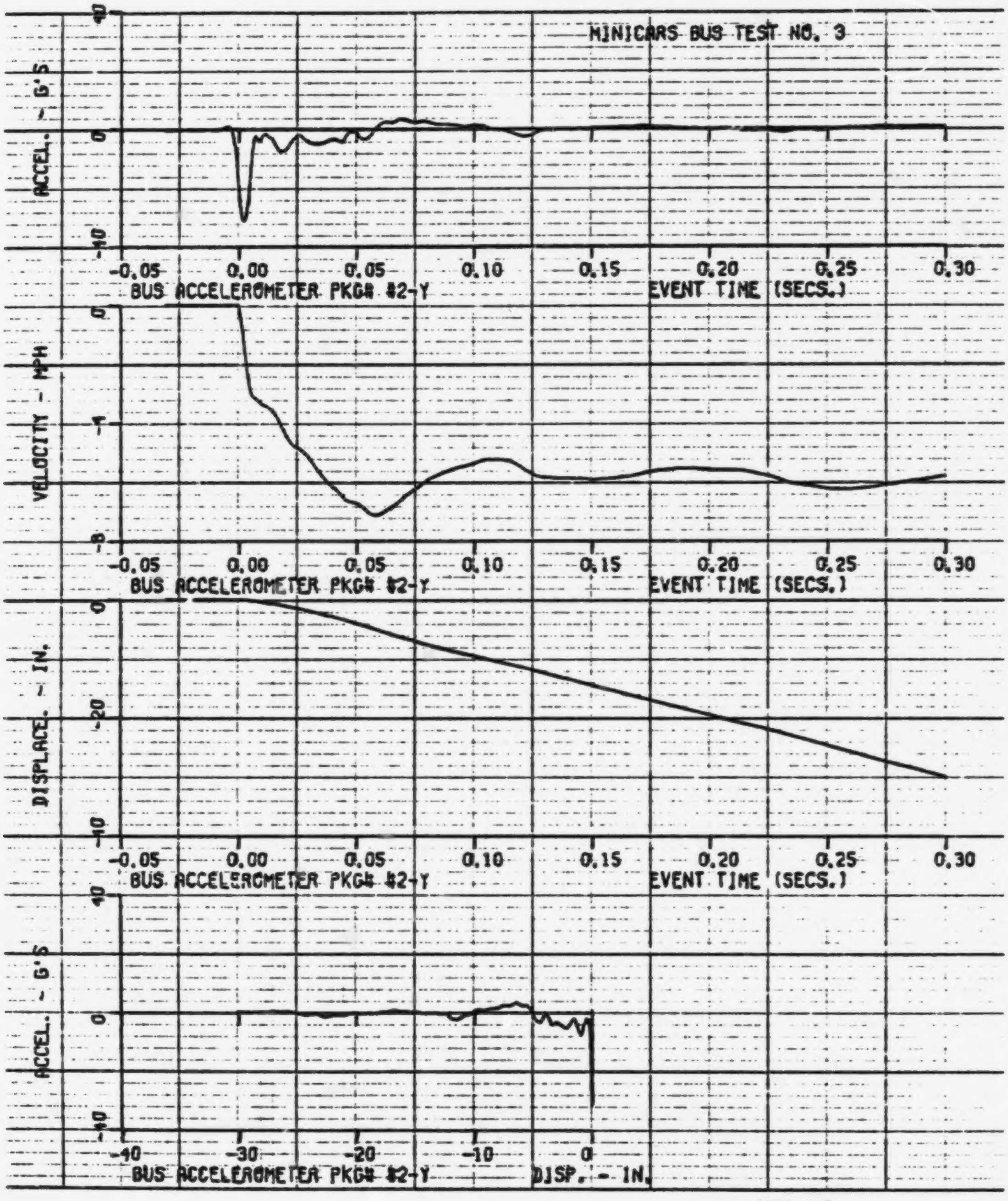
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Z
EVENT TIME (SECS.)
VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Z
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
-4
-2
0
2
4
BUS ACCELEROMETER PKG. #1-Z
DISP. - IN.

6440-V-2

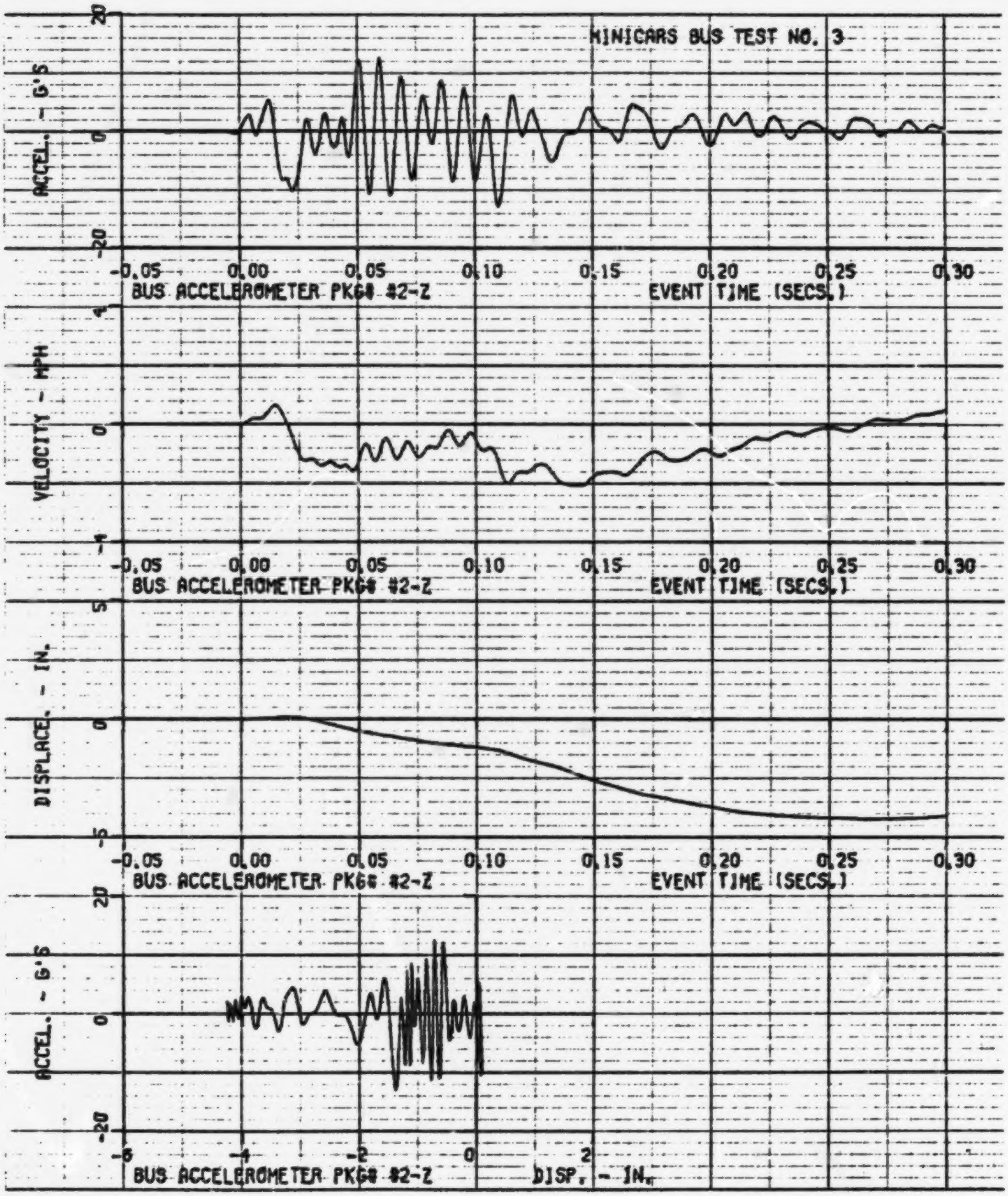

MINICARS BUS TEST NO. 3
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-X
EVENT TIME (SECS.)
VELOCITY - MPH
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-X
EVENT TIME (SECS.)
DISPLACE. - IN.
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-X
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-4.00
0.00
4.00
8.00
12.00
(X10)
BUS ACCELEROMETER PKG. #2-X
DISP. - IN.

6440-V-2

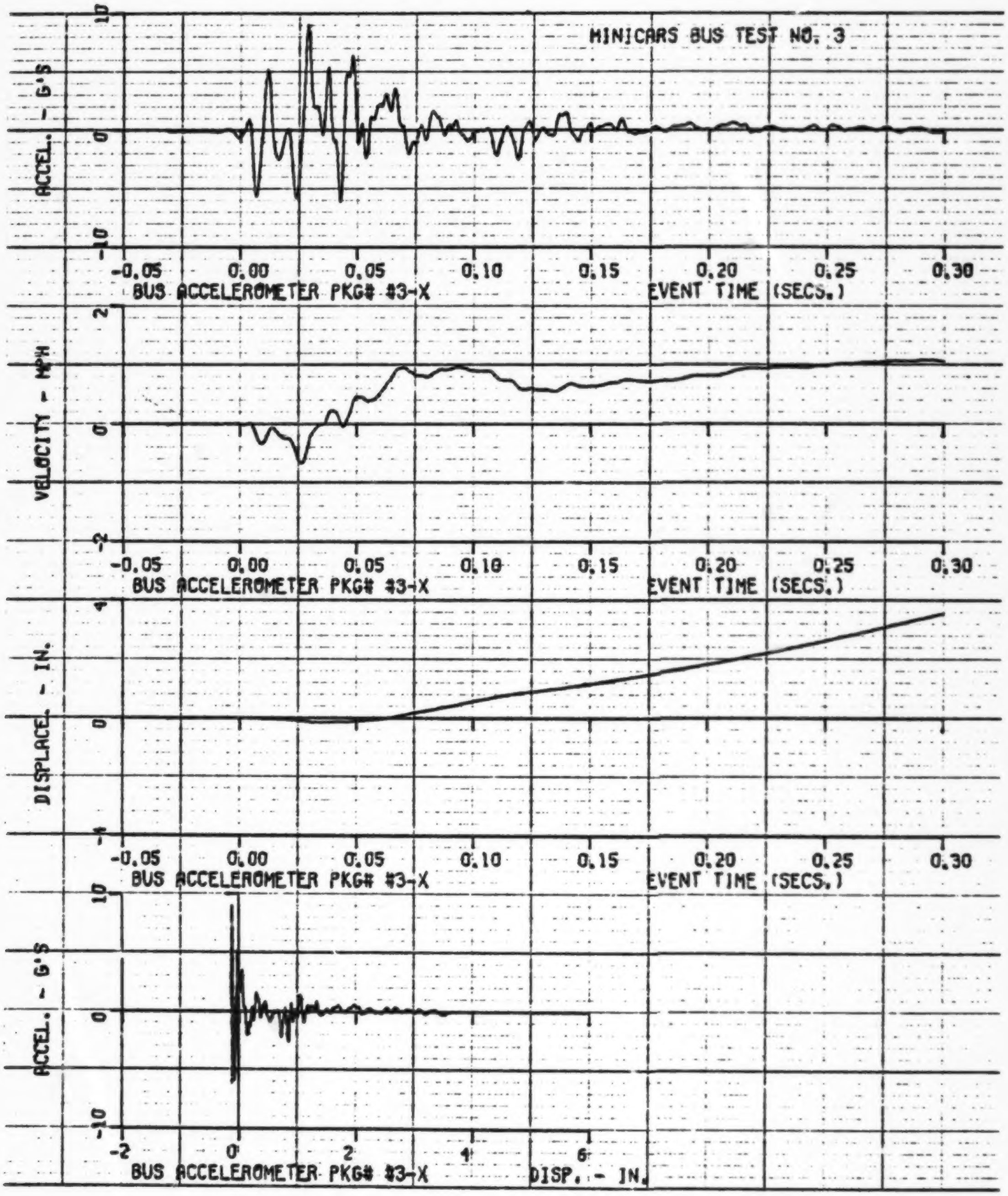

MINICARS BUS TEST NO. 3
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# #2-Y
EVENT TIME (SECS.)
VELOCITY - MPH
0
-4
-8
DISPLACE. - IN.
0
-20
-40
ACCEL. - G'S
40
0
-40
-40
-30
-20
-10
0
DISP. - IN.

6440-V-2

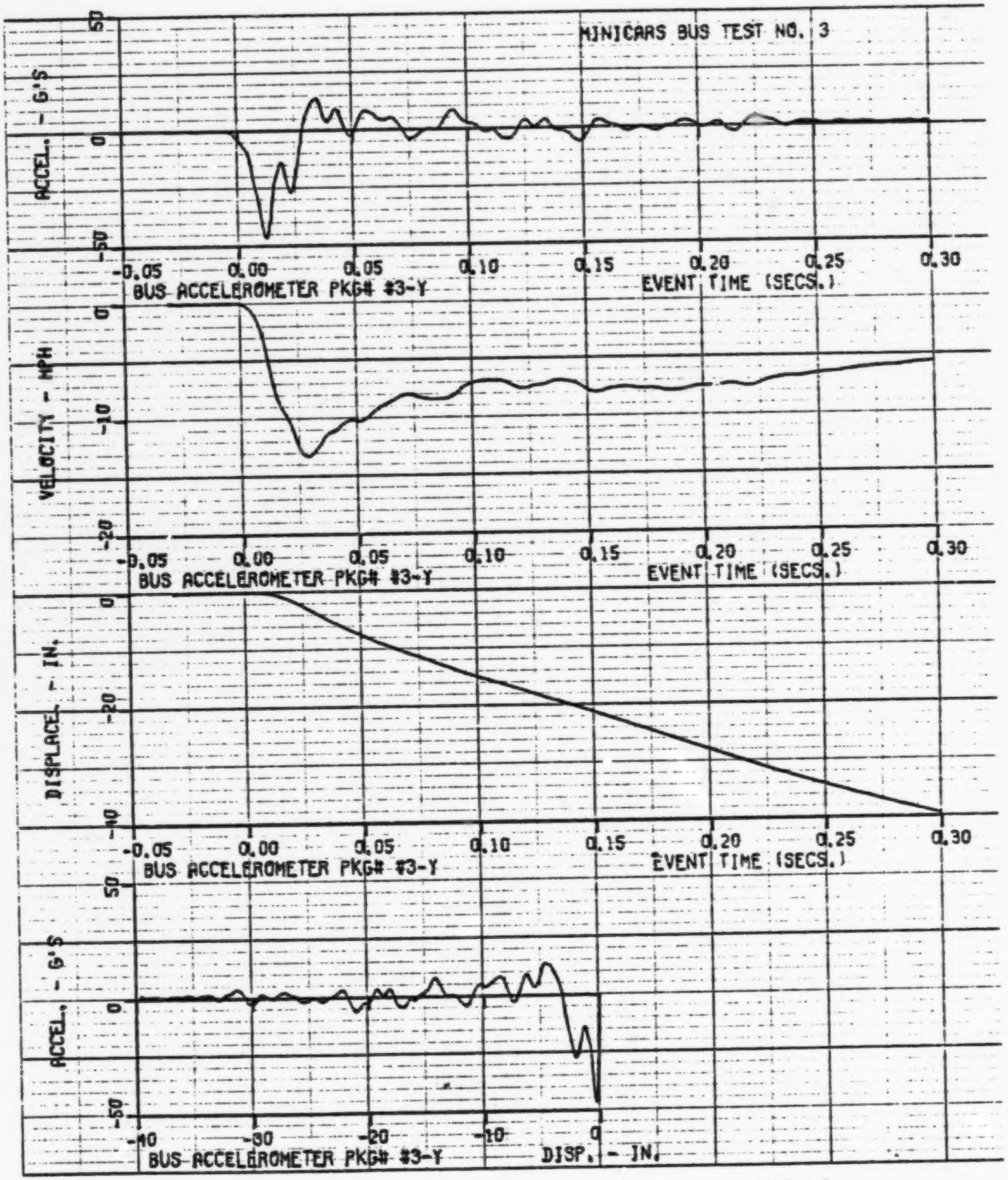
86


MINICARS BUS TEST NO. 3
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# #2-Z
EVENT TIME (SECS.)
VELOCITY - MPH
4
0
-4
DISPLACE. - IN.
5
0
-5
-6
-4
-2
0
2
DISP. - IN.

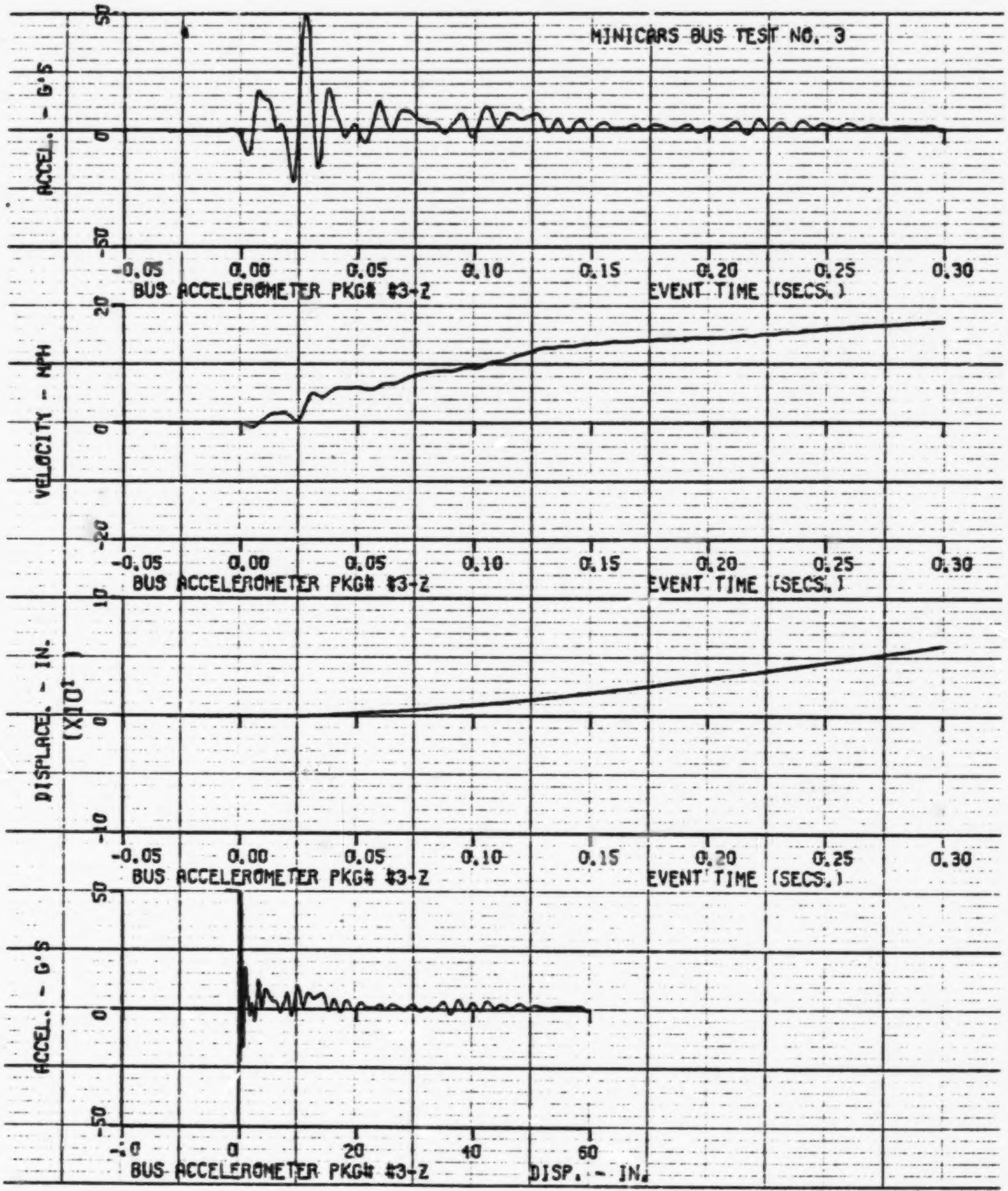
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# #3-X
EVENT TIME (SECS.)
VELOCITY - MPH
2
0
-2
DISPLACE. - IN.
4
0
-4
ACCEL. - G'S
-2
0
2
4
6
DISP. - IN.

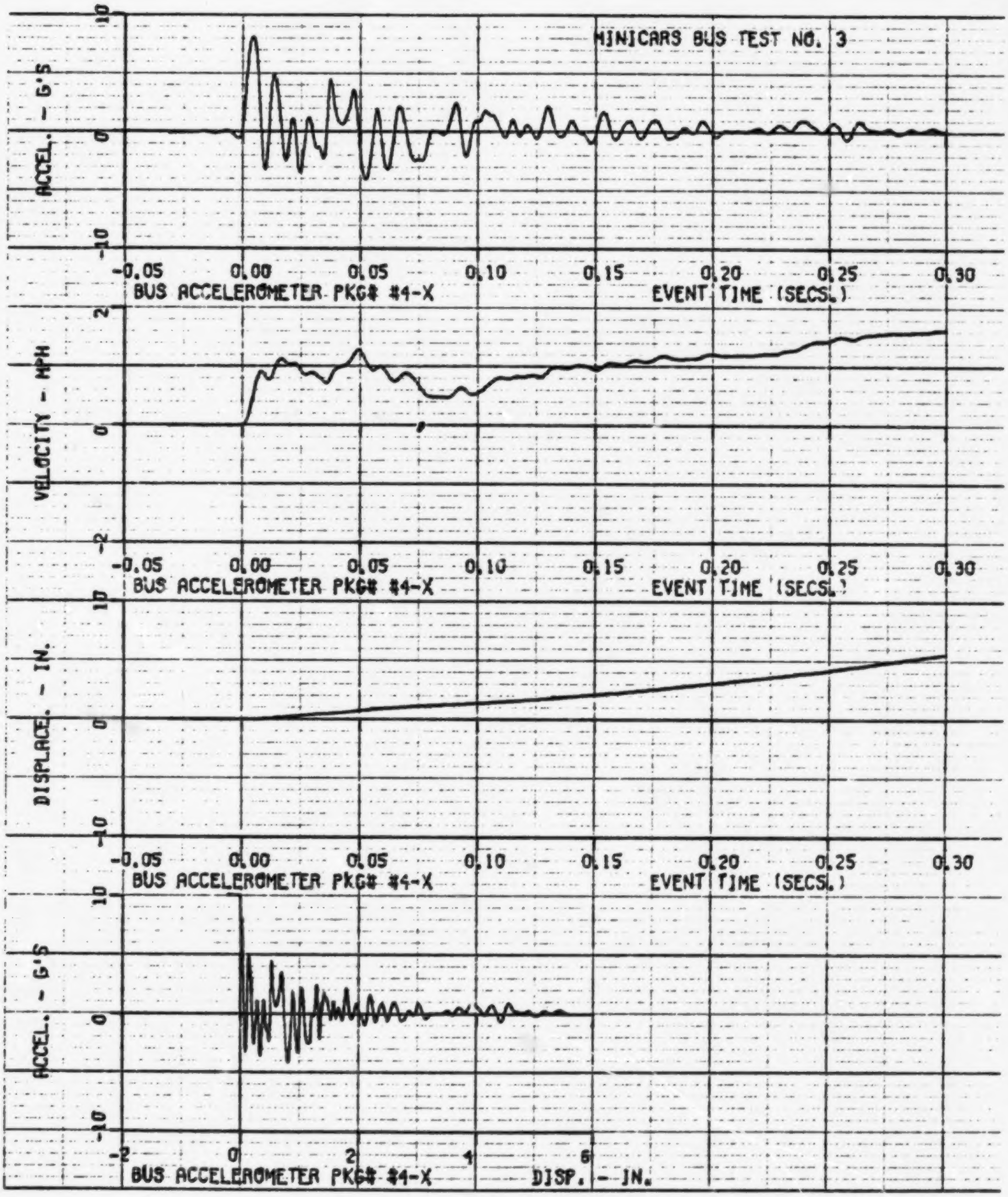
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
50
0
-50
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
BUS ACCELEROMETER PKG# #3-Y
VELOCITY - MPH
0
-10
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
BUS ACCELEROMETER PKG# #3-Y
DISPLACE. - IN.
0
-20
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
BUS ACCELEROMETER PKG# #3-Y
ACCEL. - G'S
50
0
-50
-40
-30
-20
-10
0
BUS ACCELEROMETER PKG# #3-Y
DISP. - IN.

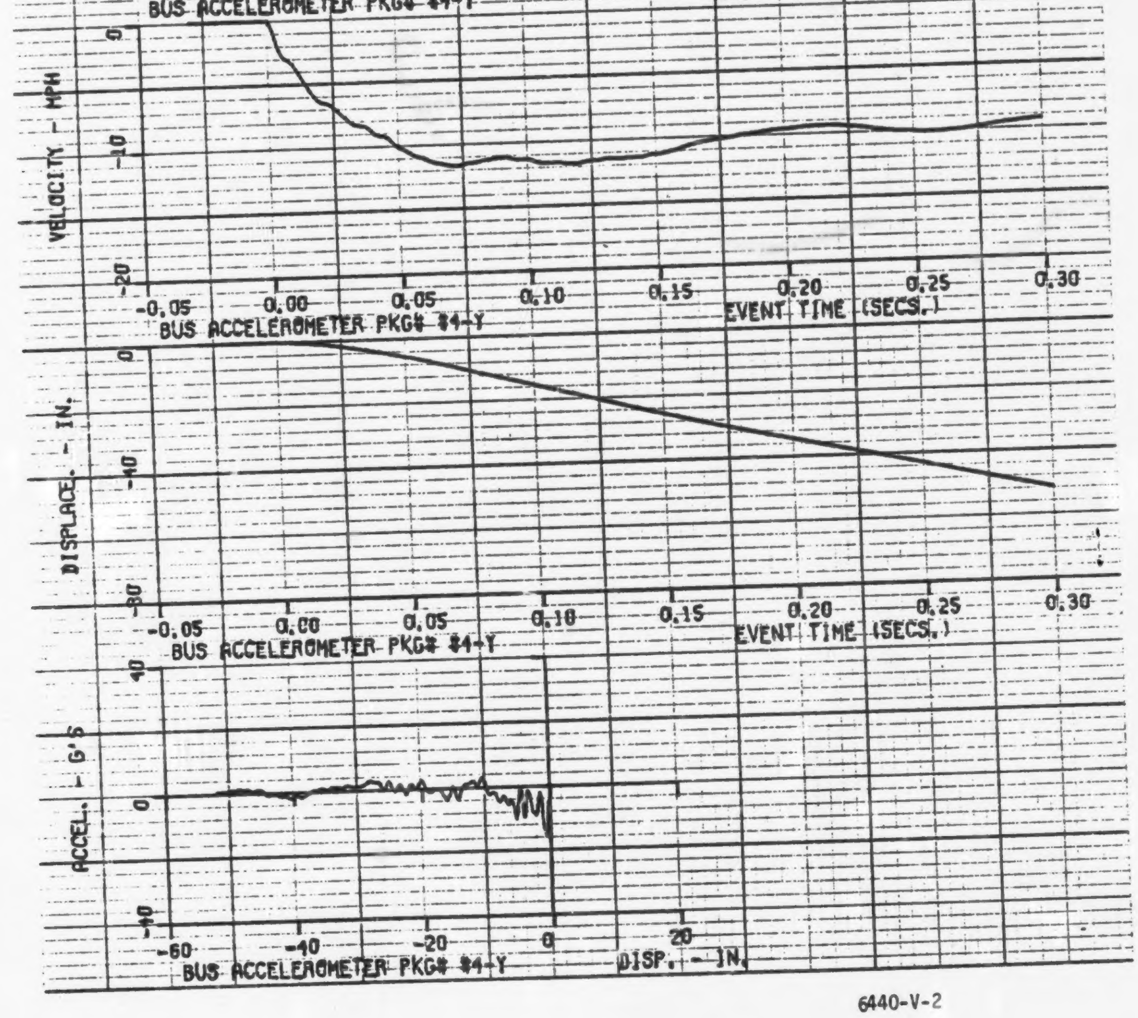
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
50
0
-50
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# #3-Z
EVENT TIME (SECS.)
VELOCITY - MPH
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# #3-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
(X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# #3-Z
EVENT TIME (SECS.)
ACCEL. - G'S
50
0
-50
-20
0
20
40
60
BUS ACCELEROMETER PKG# #3-Z
DISP. - IN.

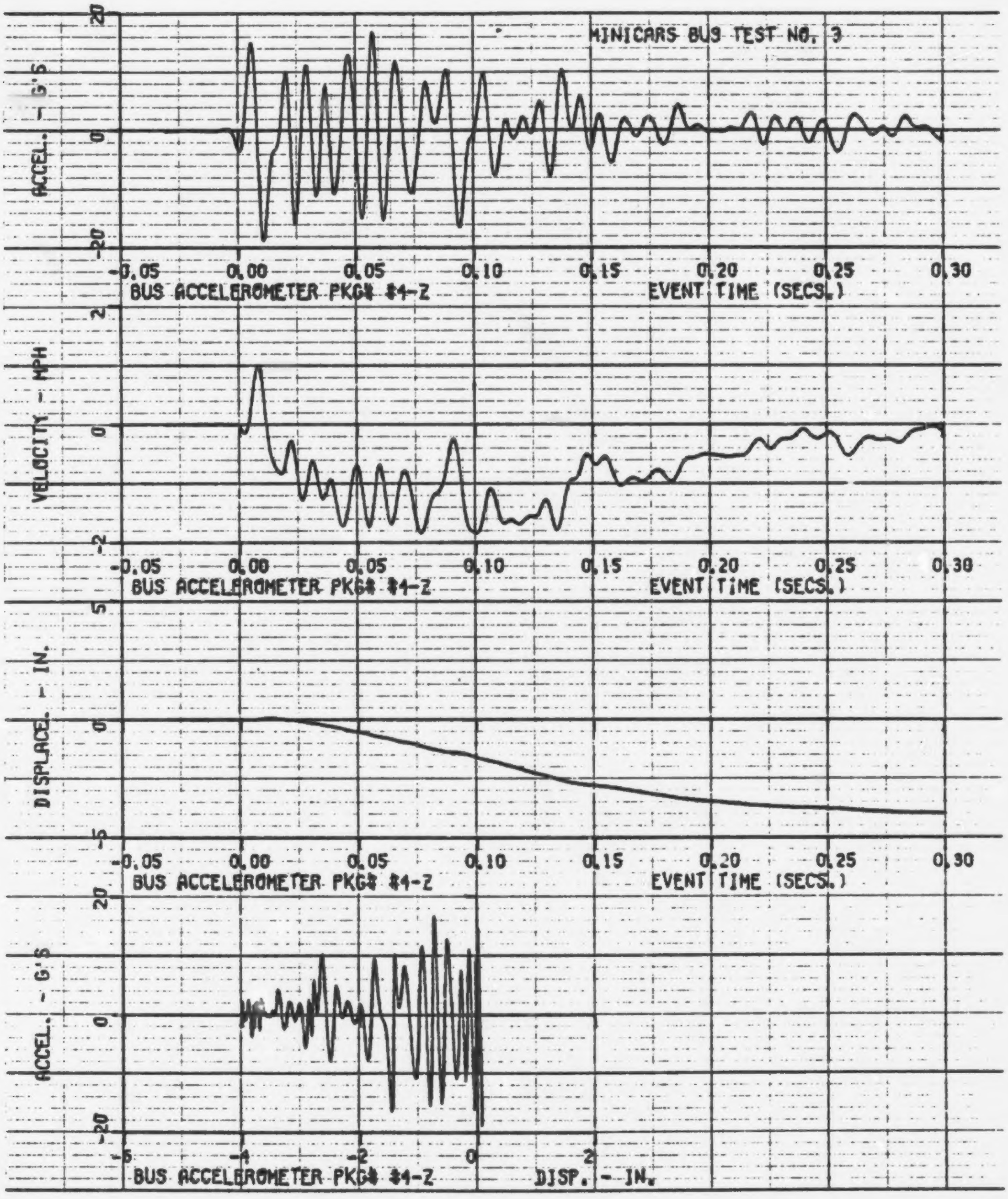
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# #4-X
EVENT TIME (SECS.)
VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# #4-X
EVENT TIME (SECS.)
DISPLACE. - IN.
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# #4-X
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-2
0
2
4
6
BUS ACCELEROMETER PKG# #4-X
DISP. - IN.

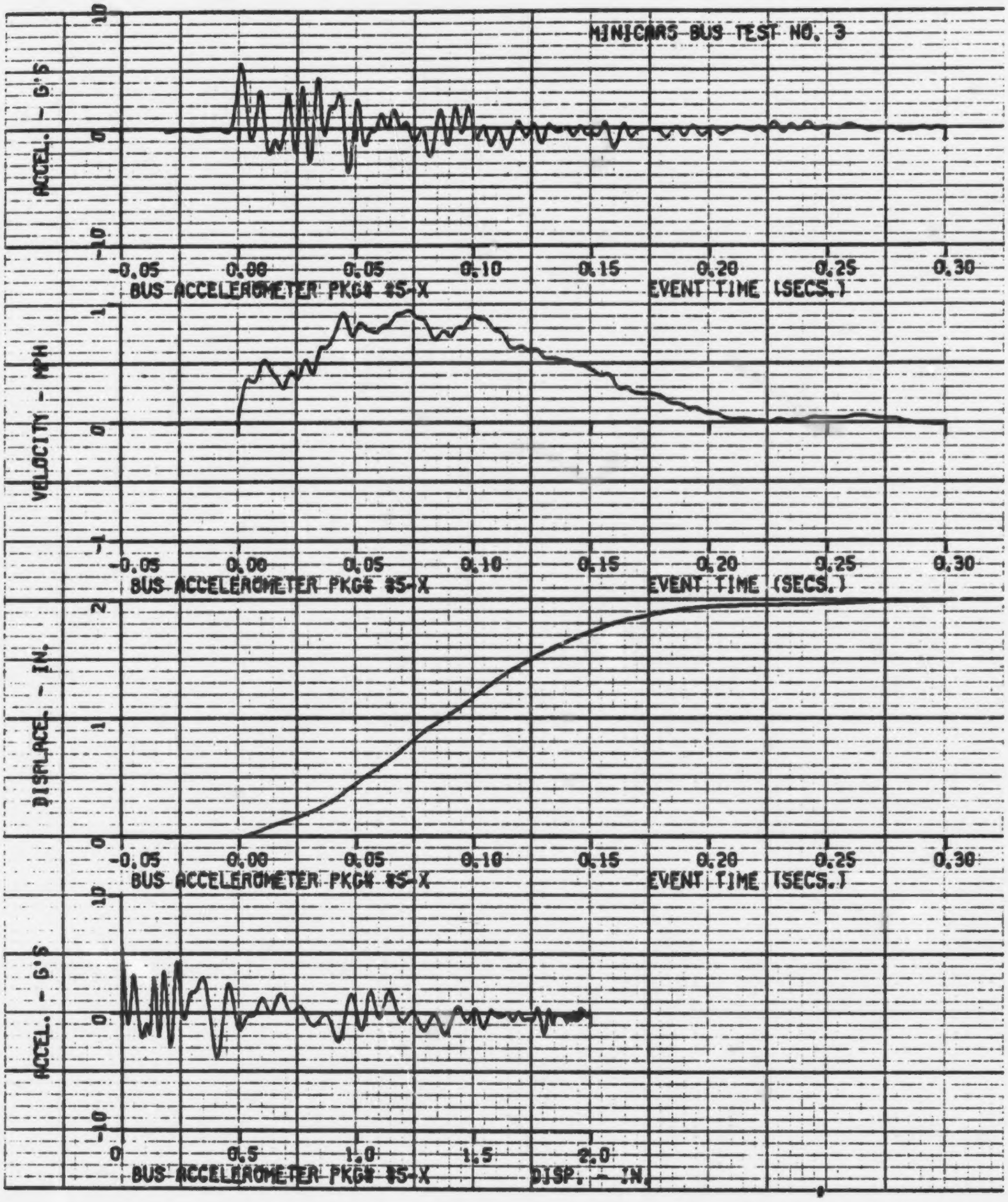
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
BUS ACCELEROMETER PKG# #4-Y
VELOCITY - MPH
0
-10
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
BUS ACCELEROMETER PKG# #4-Y
DISPLACE. - IN.
0
-10
-30
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
BUS ACCELEROMETER PKG# #4-Y
ACCEL. - G'S
40
0
-40
-60
-40
-20
0
20
DISP. - IN.
BUS ACCELEROMETER PKG# #4-Y

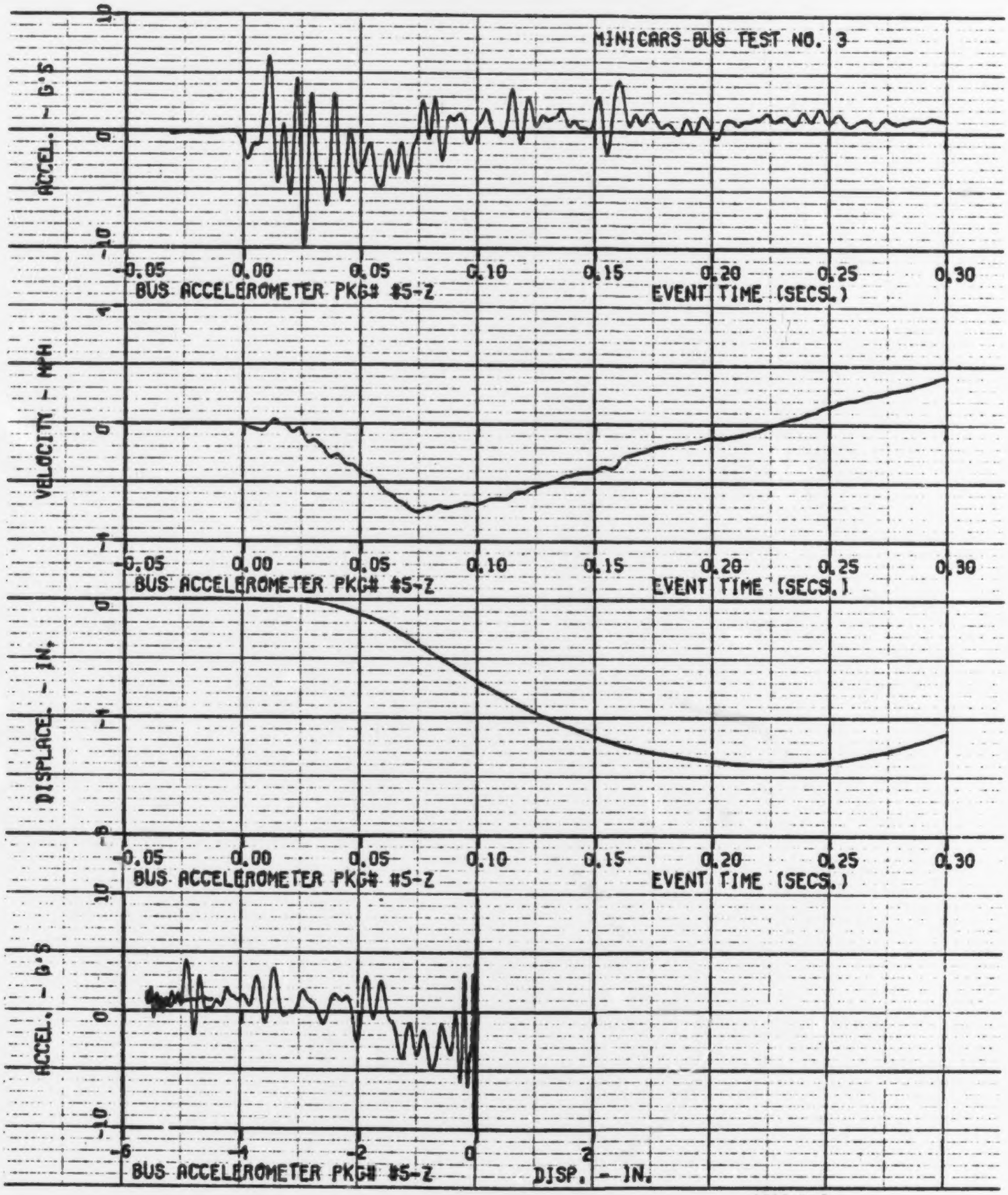
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# #4-Z
EVENT TIME (SECS.)
VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# #4-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# #4-Z
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-6
-4
-2
0
2
BUS ACCELEROMETER PKG# #4-Z
DISP. - IN.

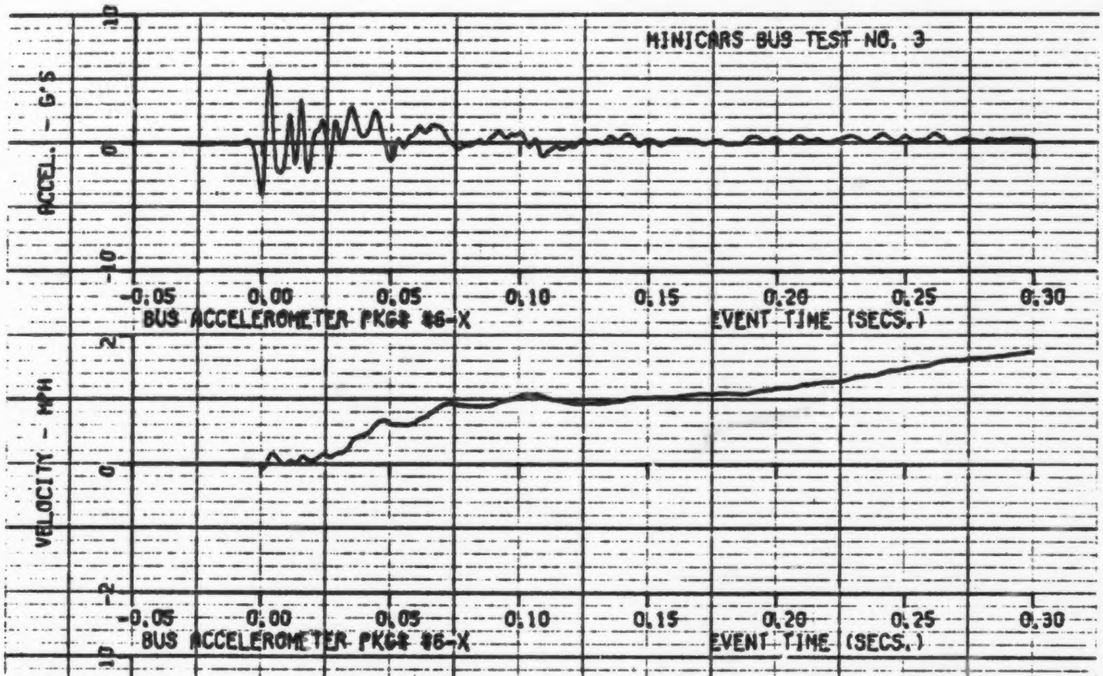
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# #5-X
EVENT TIME (SECS.)
VELOCITY - MPH
1
0
-1
DISPLACE. - IN.
2
1
0
ACCEL. - G'S
0.5
1.0
1.5
2.0
DISP. - IN.

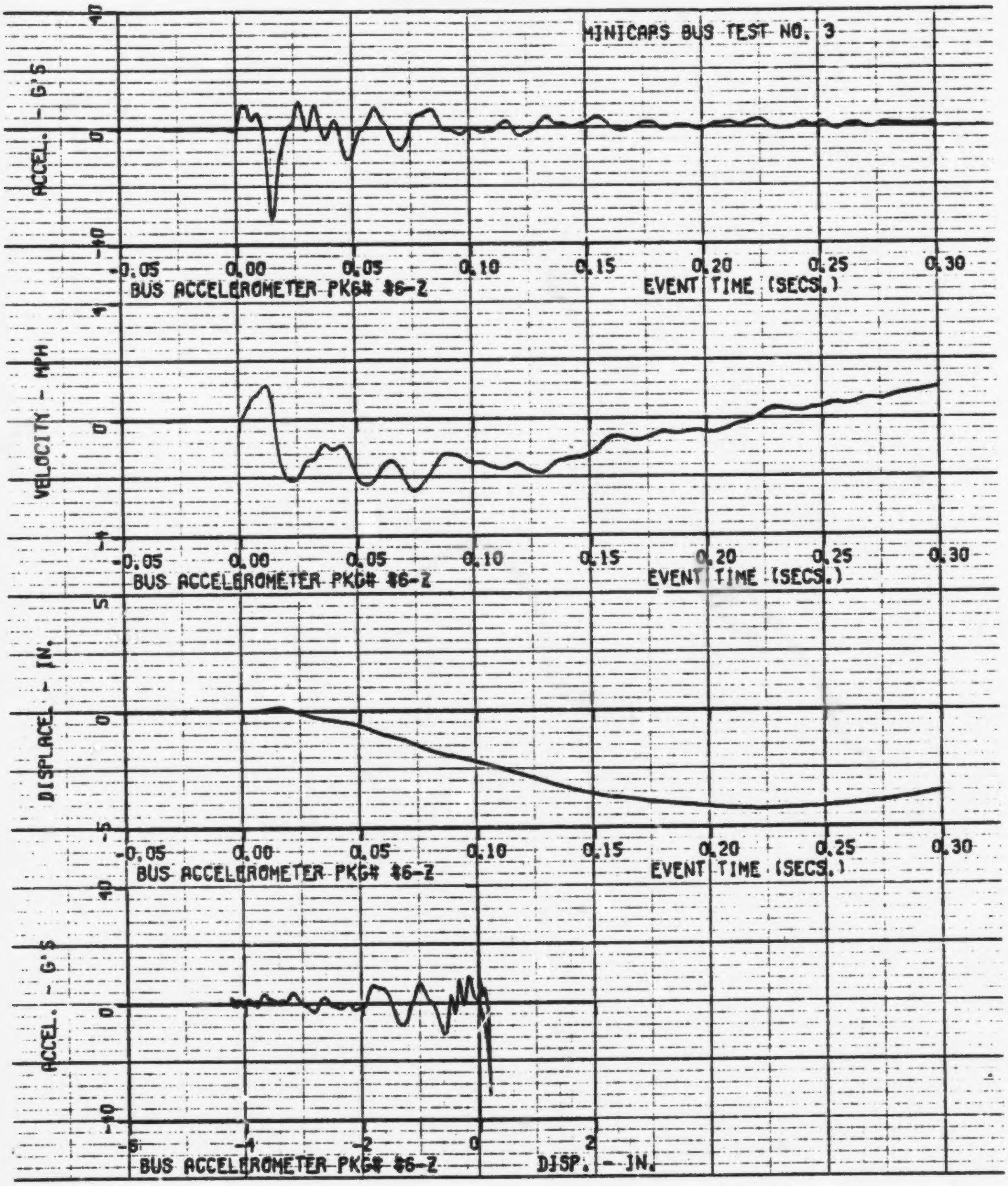
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# #5-Z
EVENT TIME (SECS.)
VELOCITY - MPH
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# #5-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-4
-8
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# #5-Z
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-6
-4
-2
0
2
BUS ACCELEROMETER PKG# #5-Z
DISP. - IN.

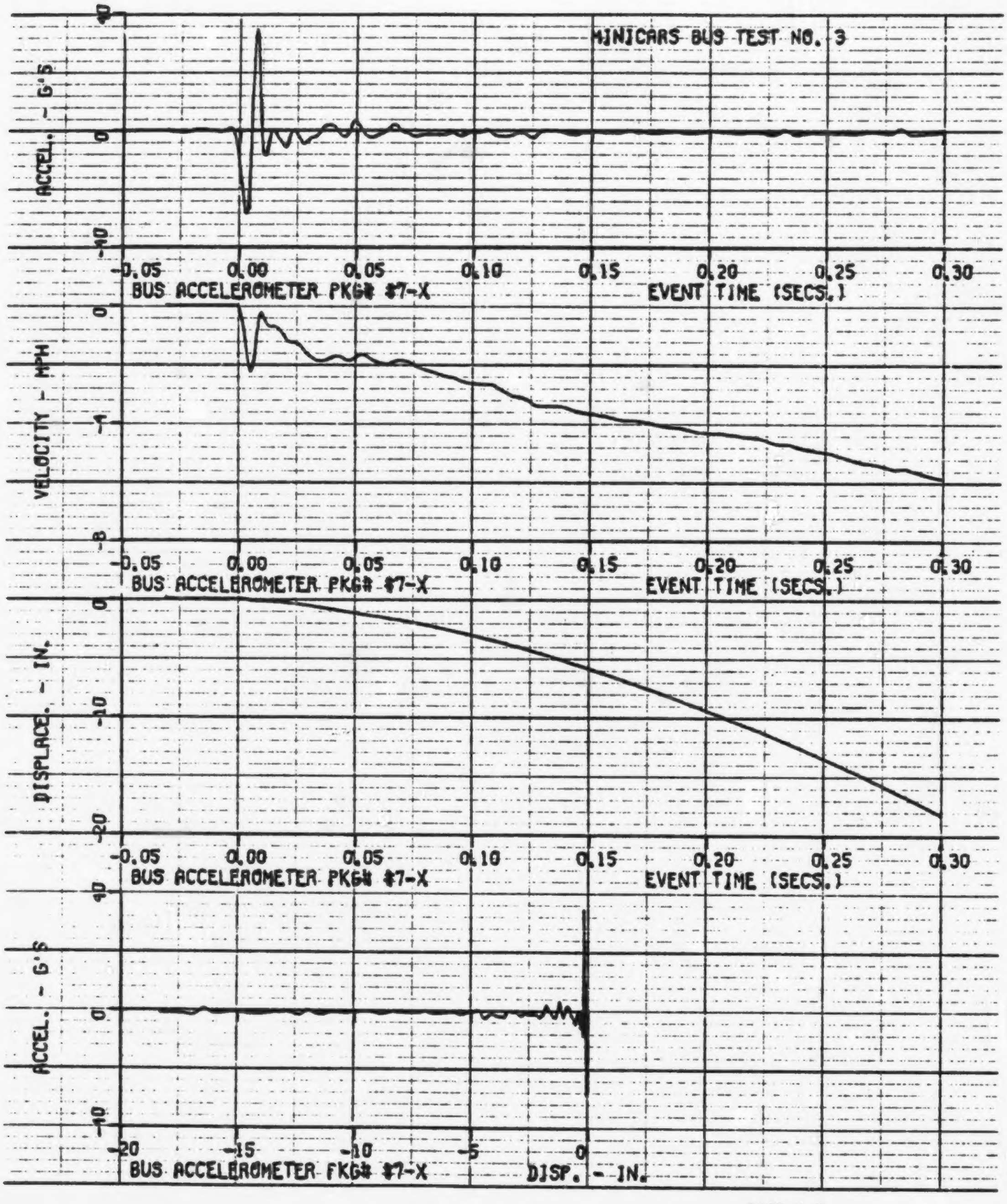
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# #6-X
EVENT TIME (SECS.)
VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# #6-X
EVENT TIME (SECS.)
DISPLACE. - IN.
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# #6-X
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-2
0
2
4
6
BUS ACCELEROMETER PKG# #6-X
DISP. - IN.

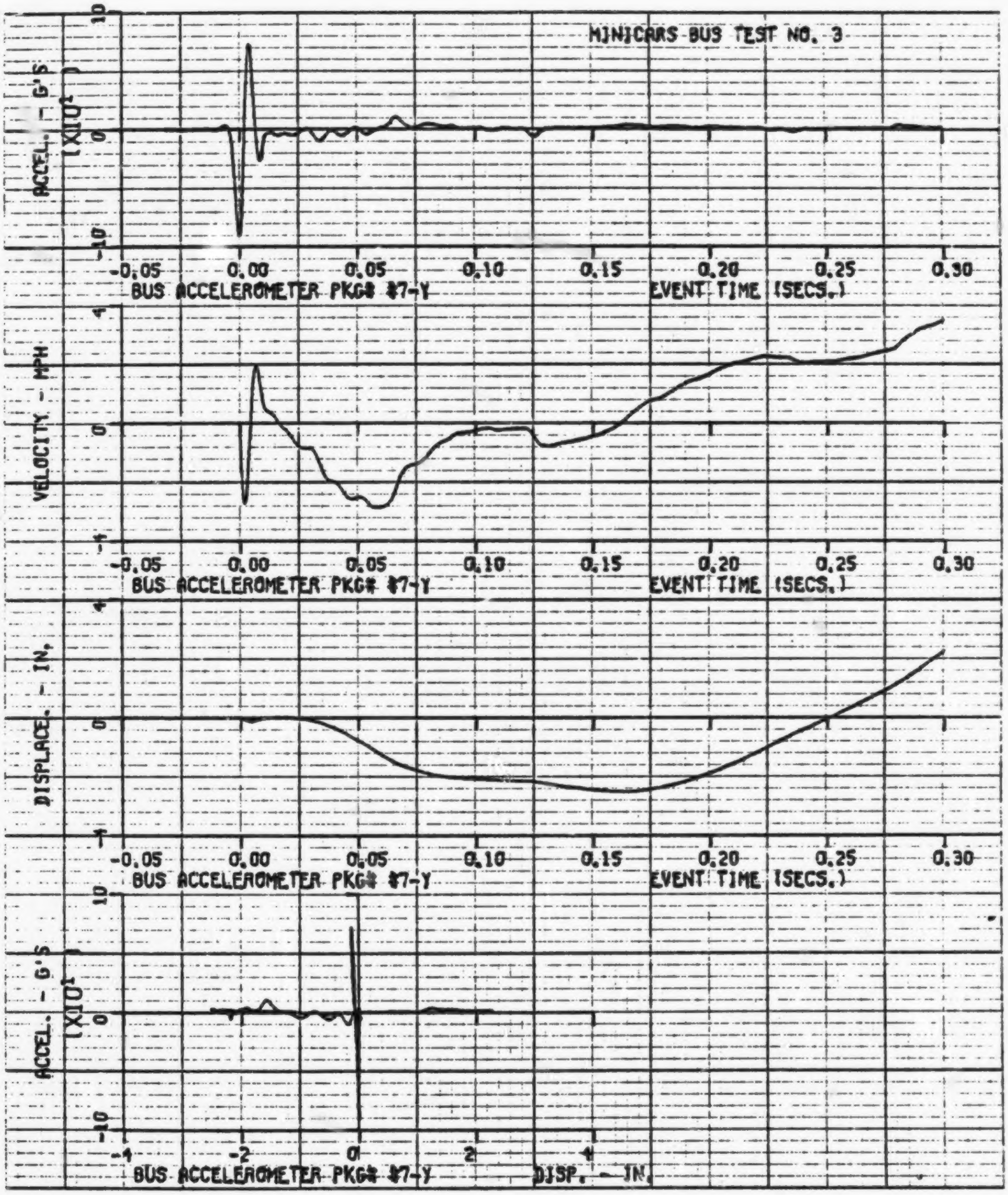
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# $6-Z
EVENT TIME (SECS.)
VELOCITY - MPH
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# $6-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# $6-Z
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
-6
-4
-2
0
2
BUS ACCELEROMETER PKG# $6-Z
DISP. - IN.

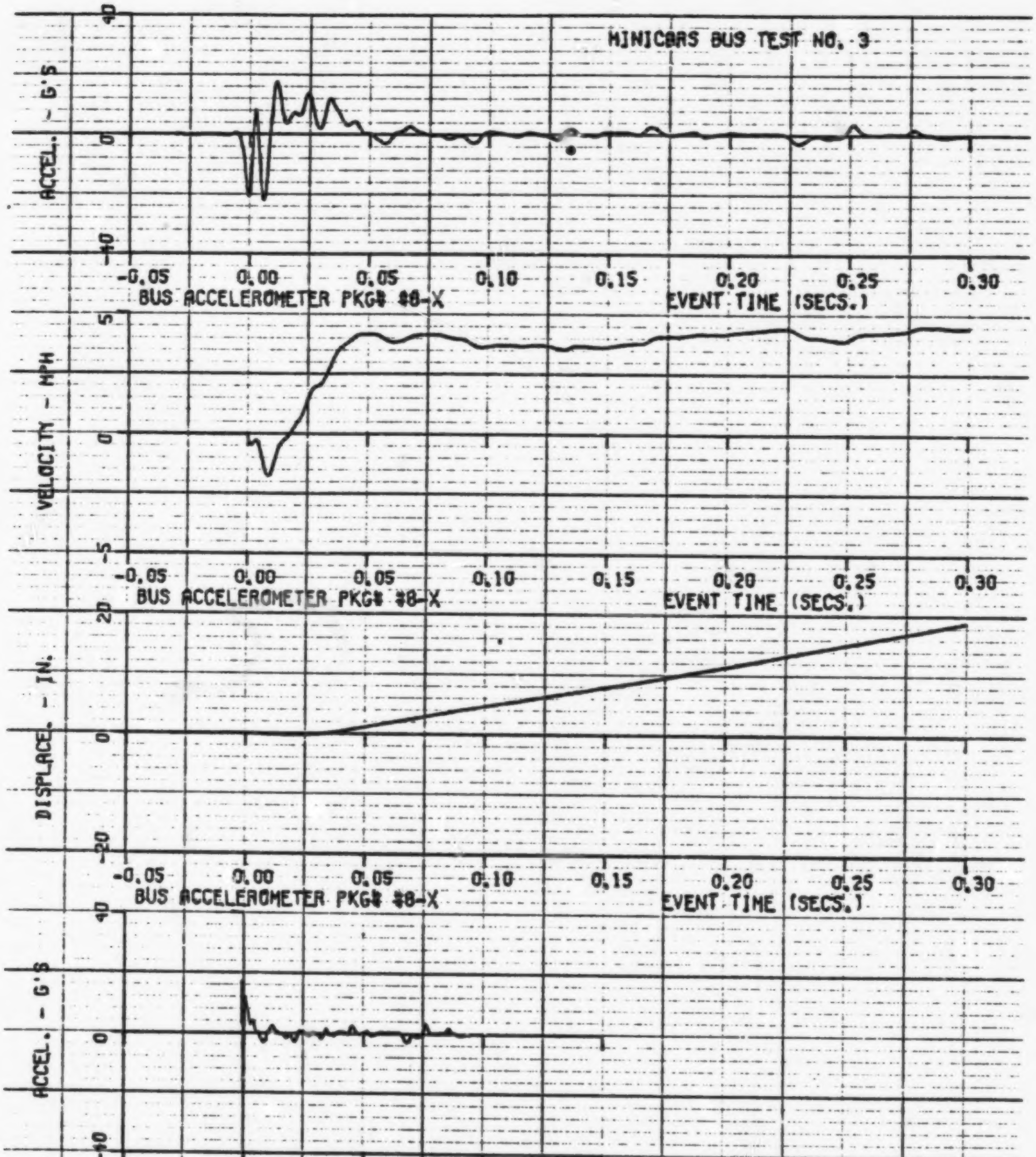
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# #7-X
EVENT TIME (SECS.)
VELOCITY - MPH
0
-1
-3
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# #7-X
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-10
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# #7-X
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-20
-15
-10
-5
0
BUS ACCELEROMETER PKG# #7-X
DISP. - IN.

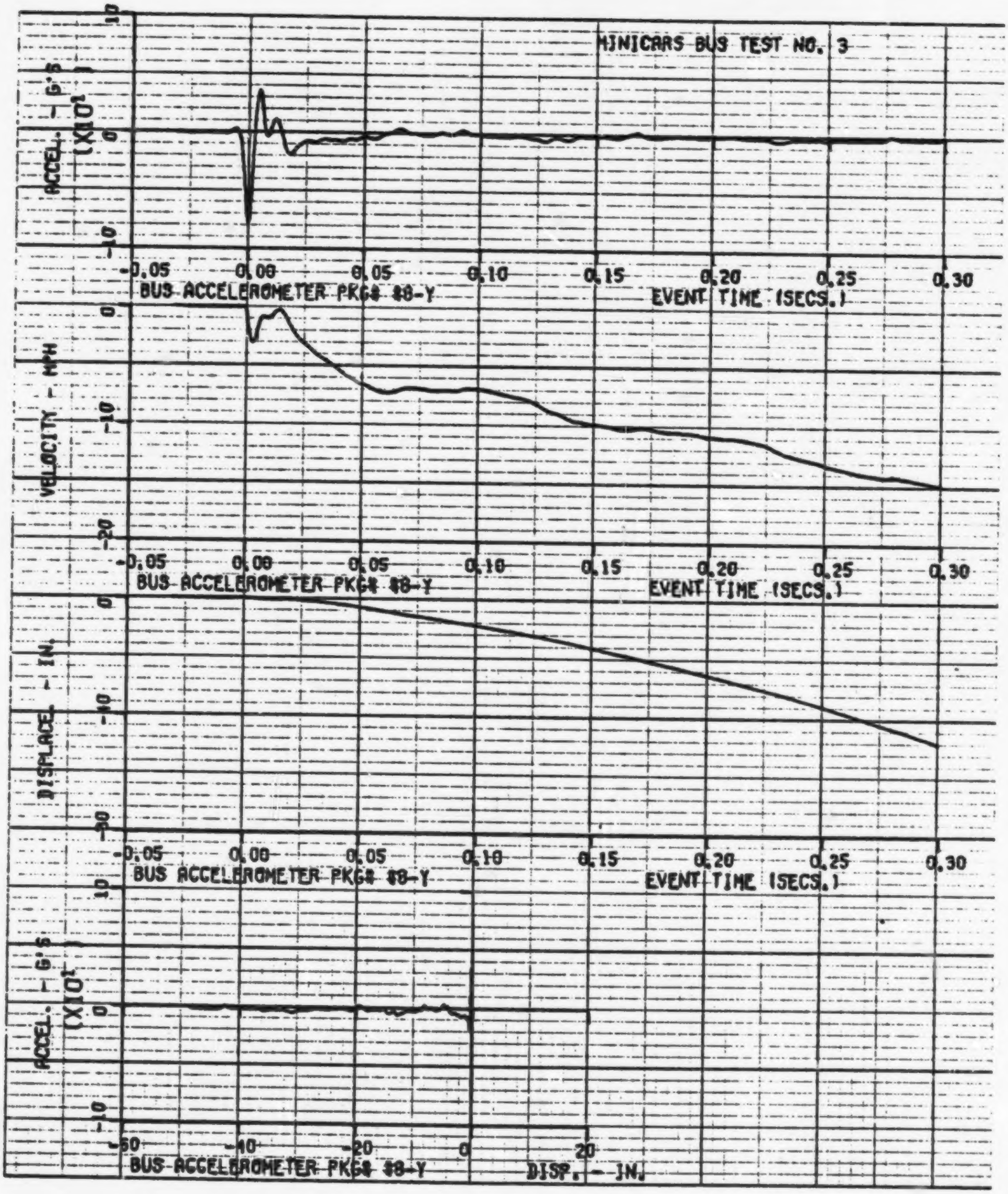
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S (X10²)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# #7-Y
EVENT TIME (SECS.)
VELOCITY - MPH
4
0
-4
DISPLACE. - IN.
ACCEL. - G'S (X10²)
-4
-2
0
2
4
DISP. - IN.

6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# #8-X
EVENT TIME (SECS.)
VELOCITY - MPH
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# #8-X
EVENT TIME (SECS.)
DISPLACE. - IN.
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# #8-X
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
-10
0
10
20
30
BUS ACCELEROMETER PKG# #8-X
DISP. - IN.

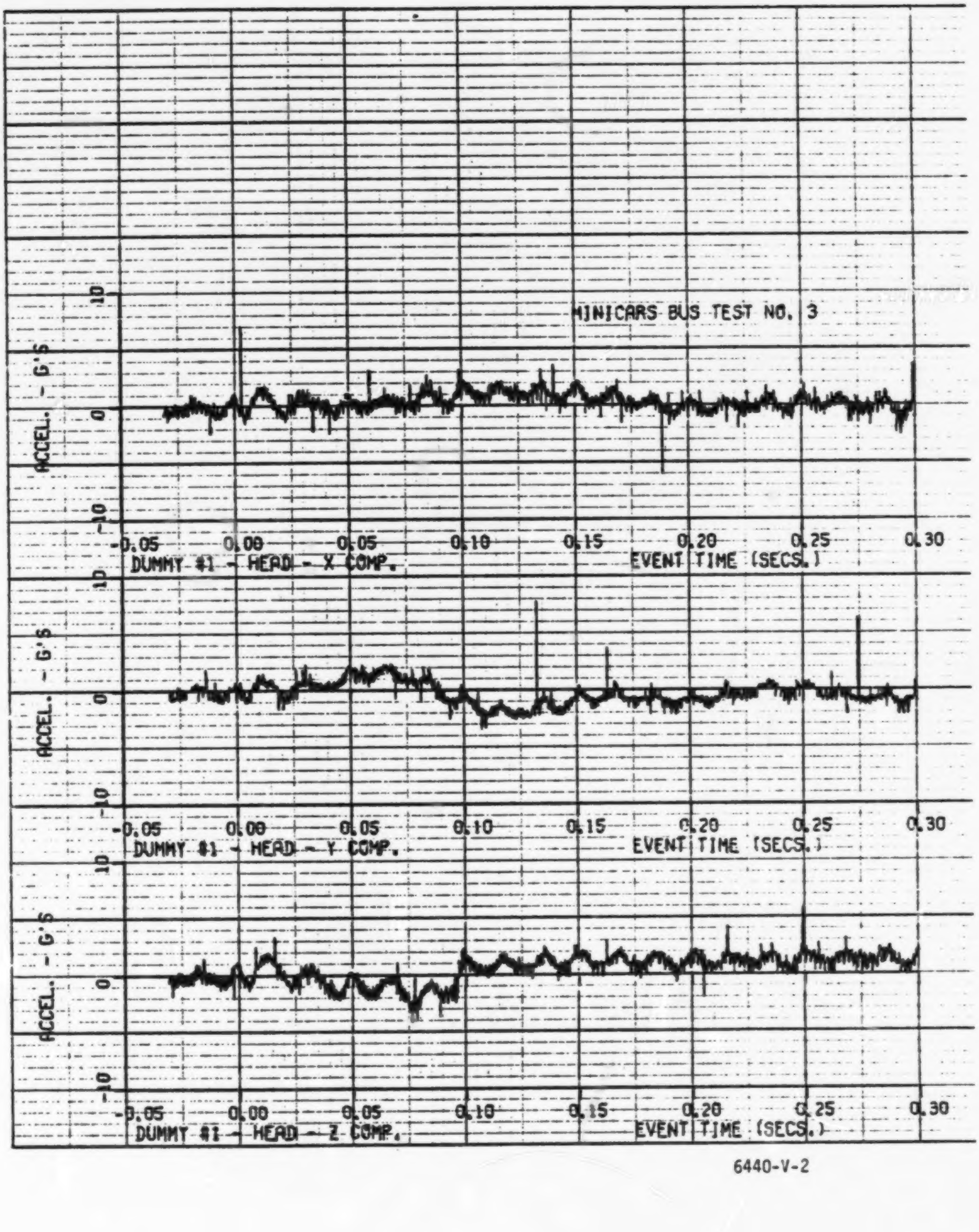
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S (X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# 8-Y
EVENT TIME (SECS.)
VELOCITY - MPH
0
-10
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# 8-Y
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-10
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG# 8-Y
EVENT TIME (SECS.)
ACCEL. - G'S (X10¹)
10
0
-10
-60
-40
-20
0
20
BUS ACCELEROMETER PKG# 8-Y
DISP. - IN.

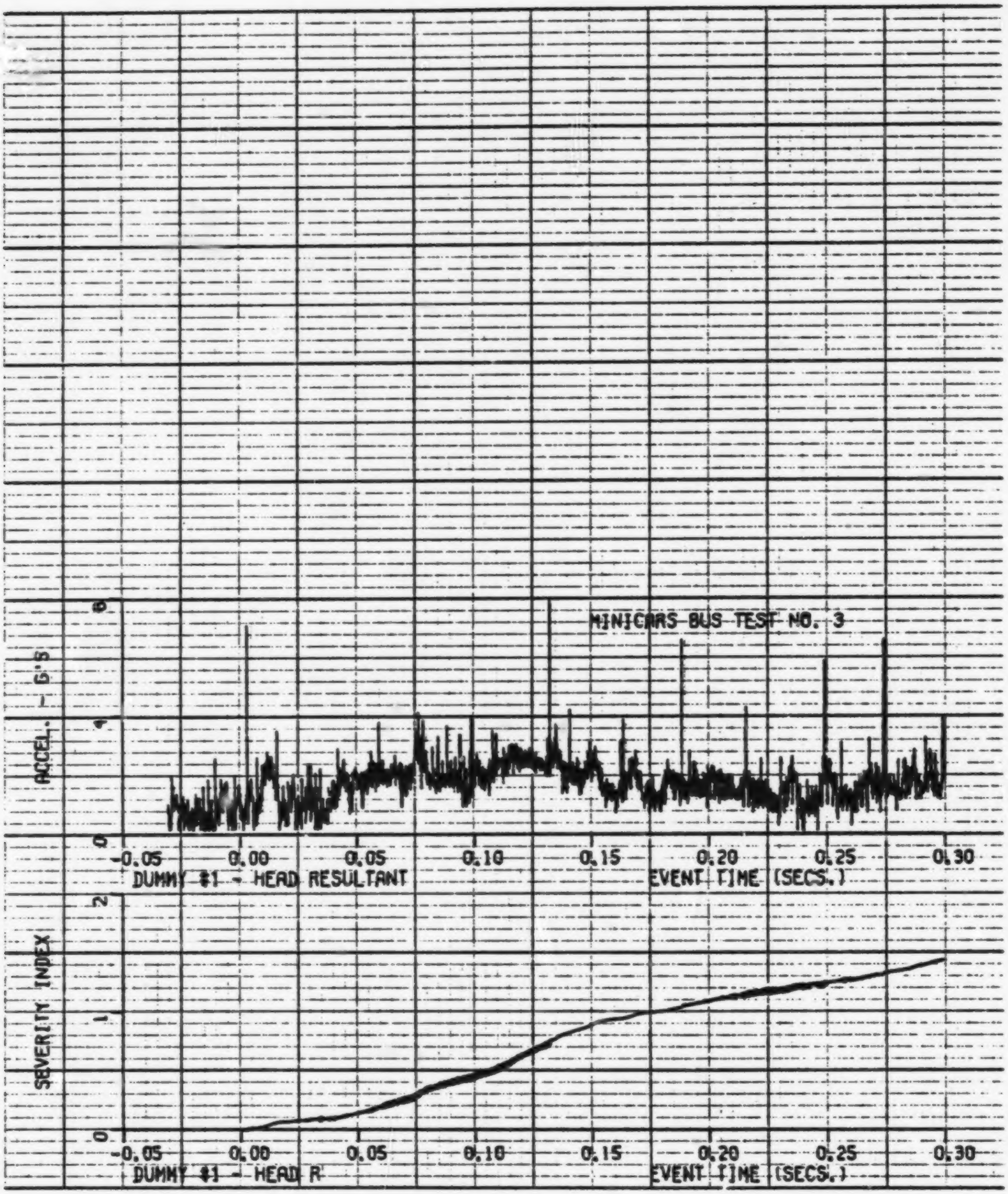
6440-V-2

DUMMY DATA

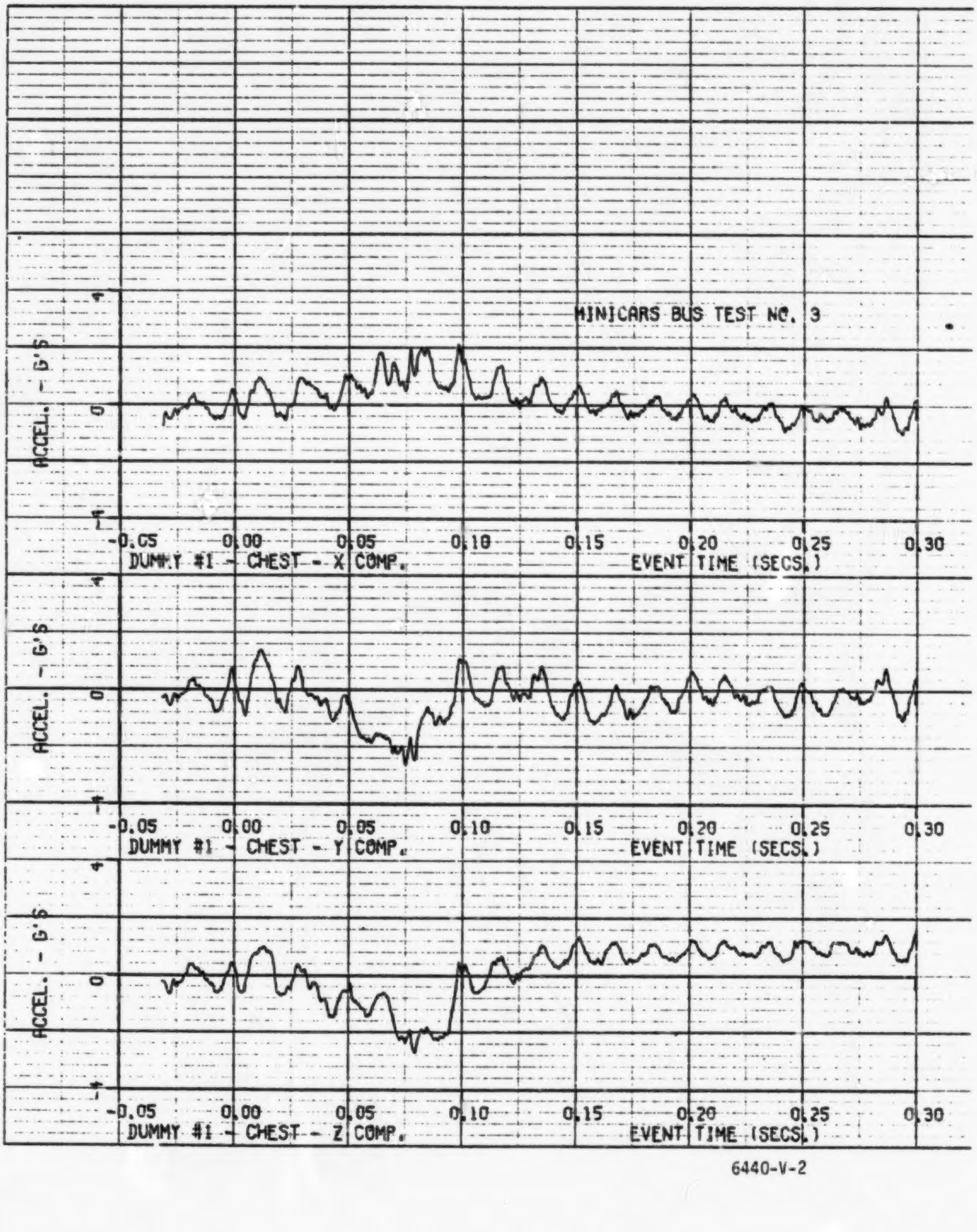
	FILTER CHANNEL CLASS
HEAD ACCELERATION	1000
CHEST ACCELERATION	180
BELT LOADS	60
FEMUR LOADS	600


MINICARS BUS TEST NO. 3
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - HEAD - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - HEAD - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - HEAD - Z COMP.
EVENT TIME (SECS.)

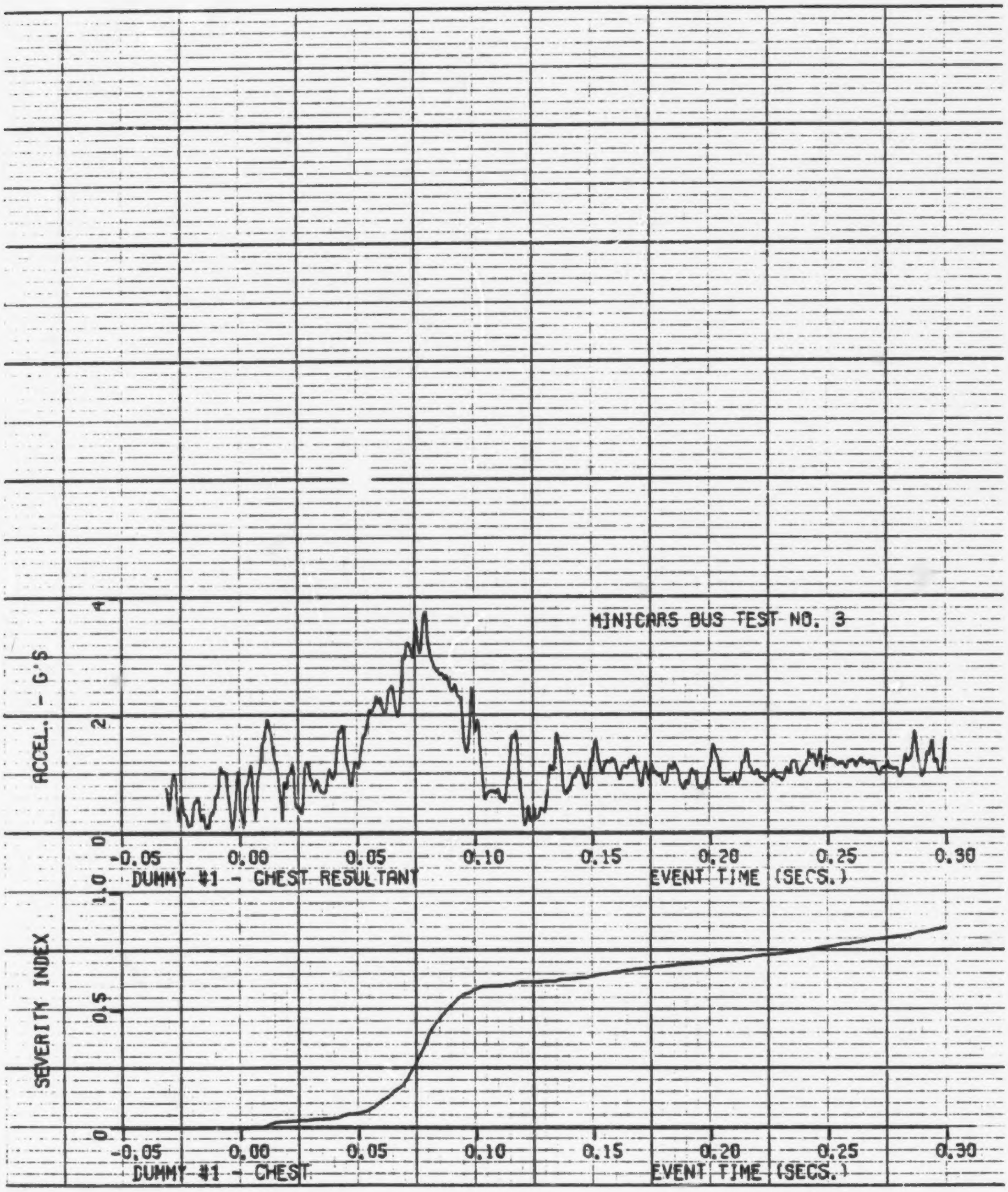
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
8
4
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
2
1
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - HEAD R
EVENT TIME (SECS.)

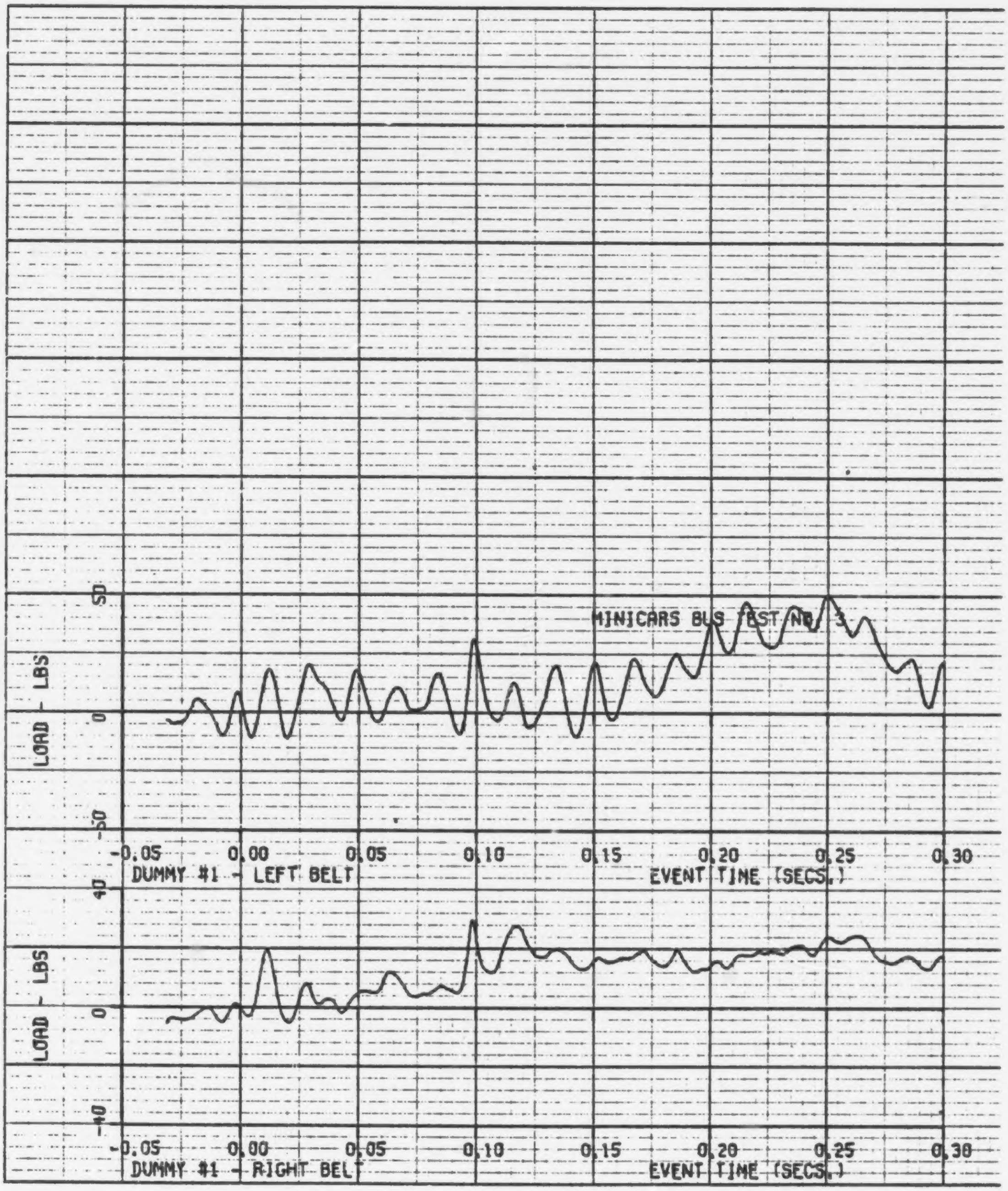
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST - Z COMP.
EVENT TIME (SECS.)

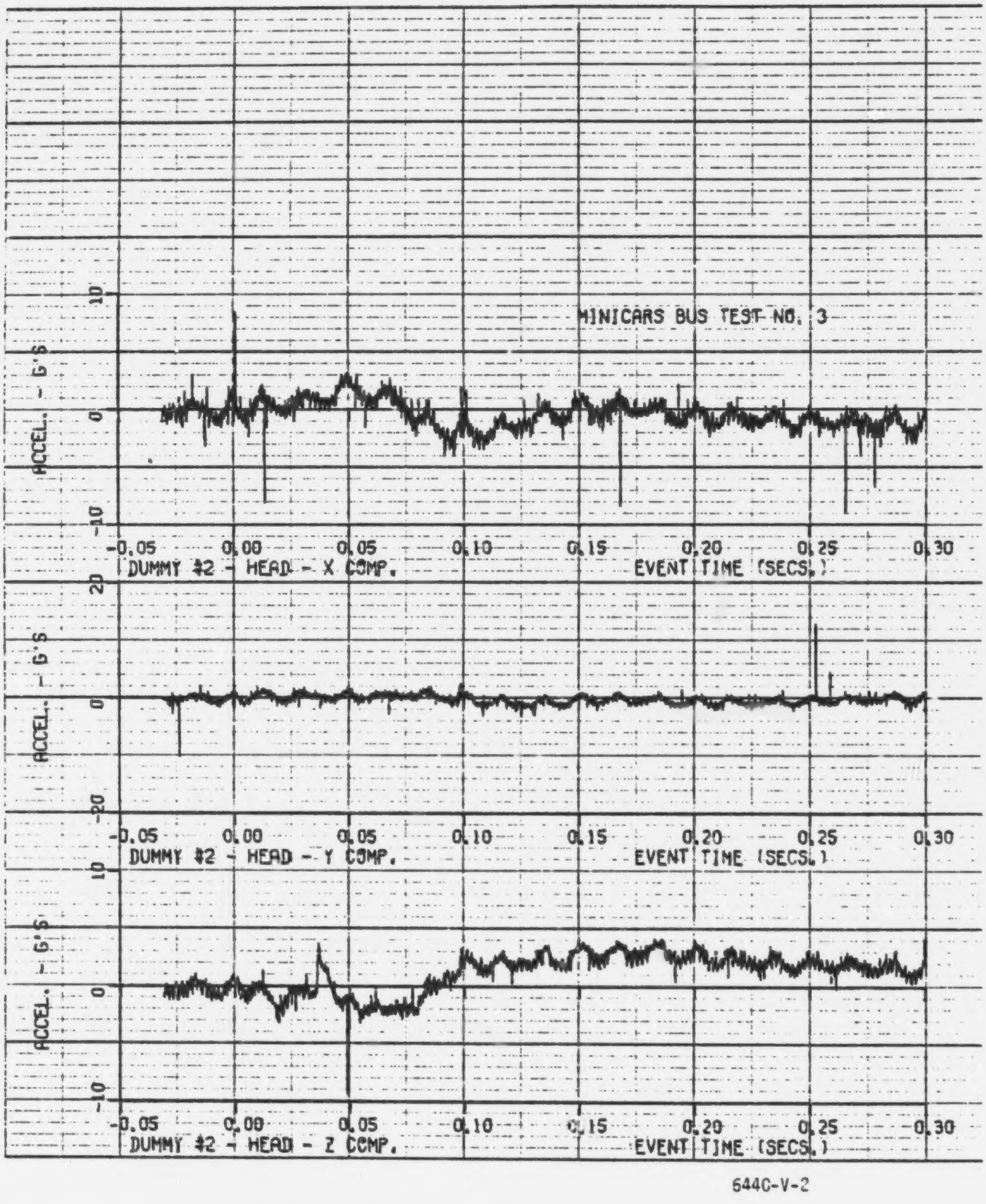
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
0
2
4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
0
0.5
1.0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST
EVENT TIME (SECS.)

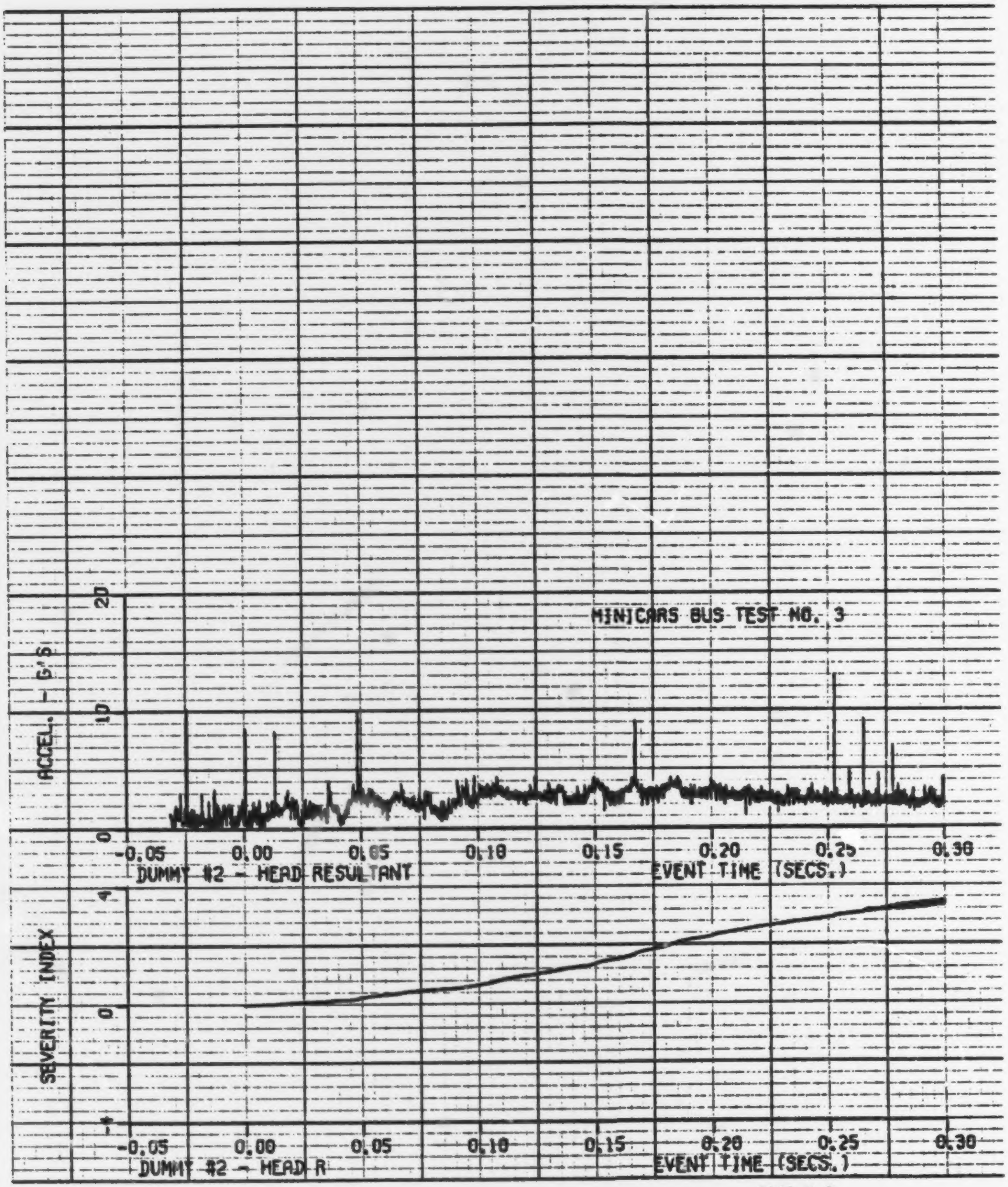
6440-V-2


MINICARS BUS TEST NO. 3
LOAD - LBS
50
0
-50
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - LEFT BELT
EVENT TIME (SECS.)
LOAD - LBS
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - RIGHT BELT
EVENT TIME (SECS.)

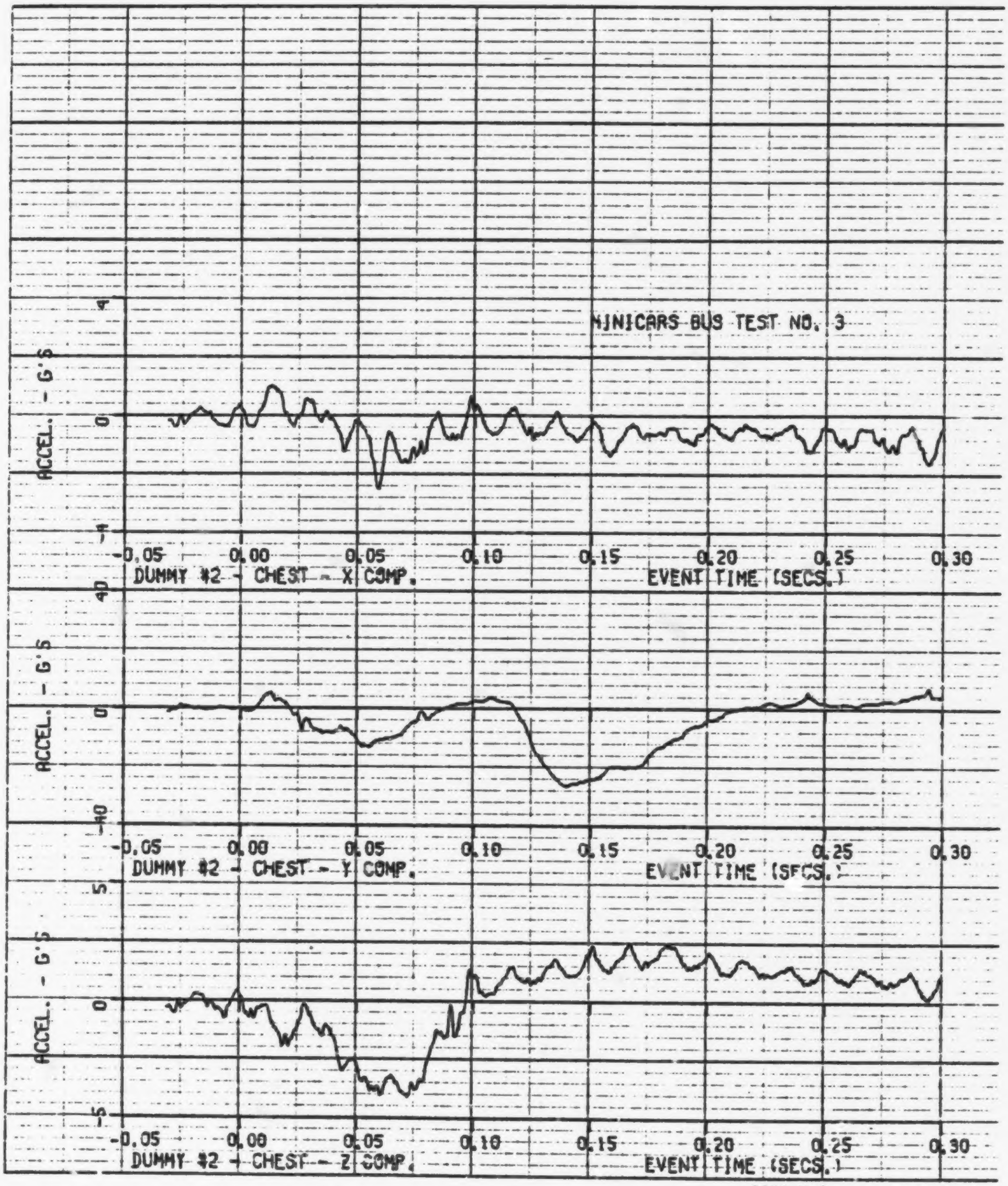
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - HEAD - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - HEAD - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - HEAD - Z COMP.
EVENT TIME (SECS.)

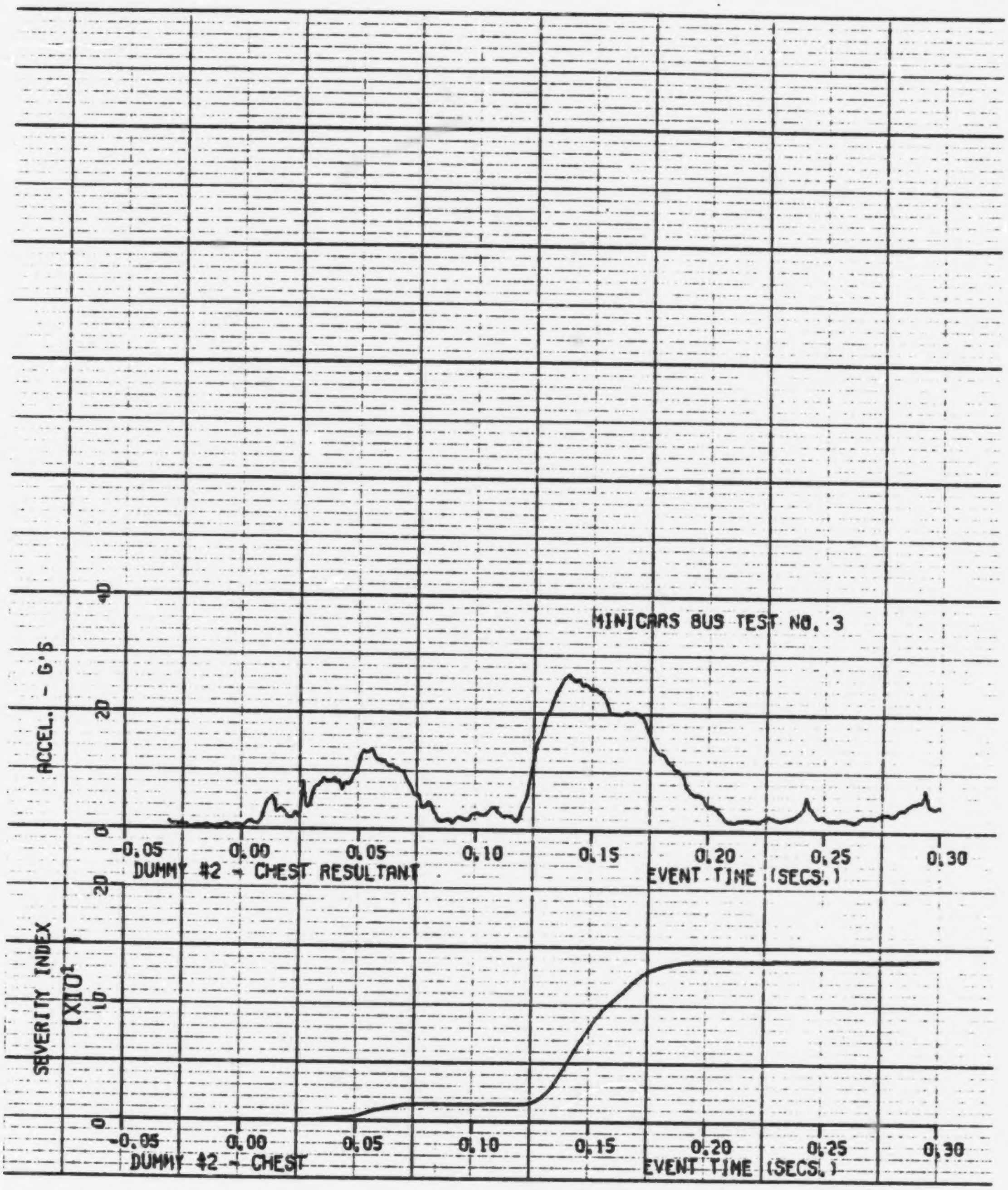
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - HEAD R
EVENT TIME (SECS.)

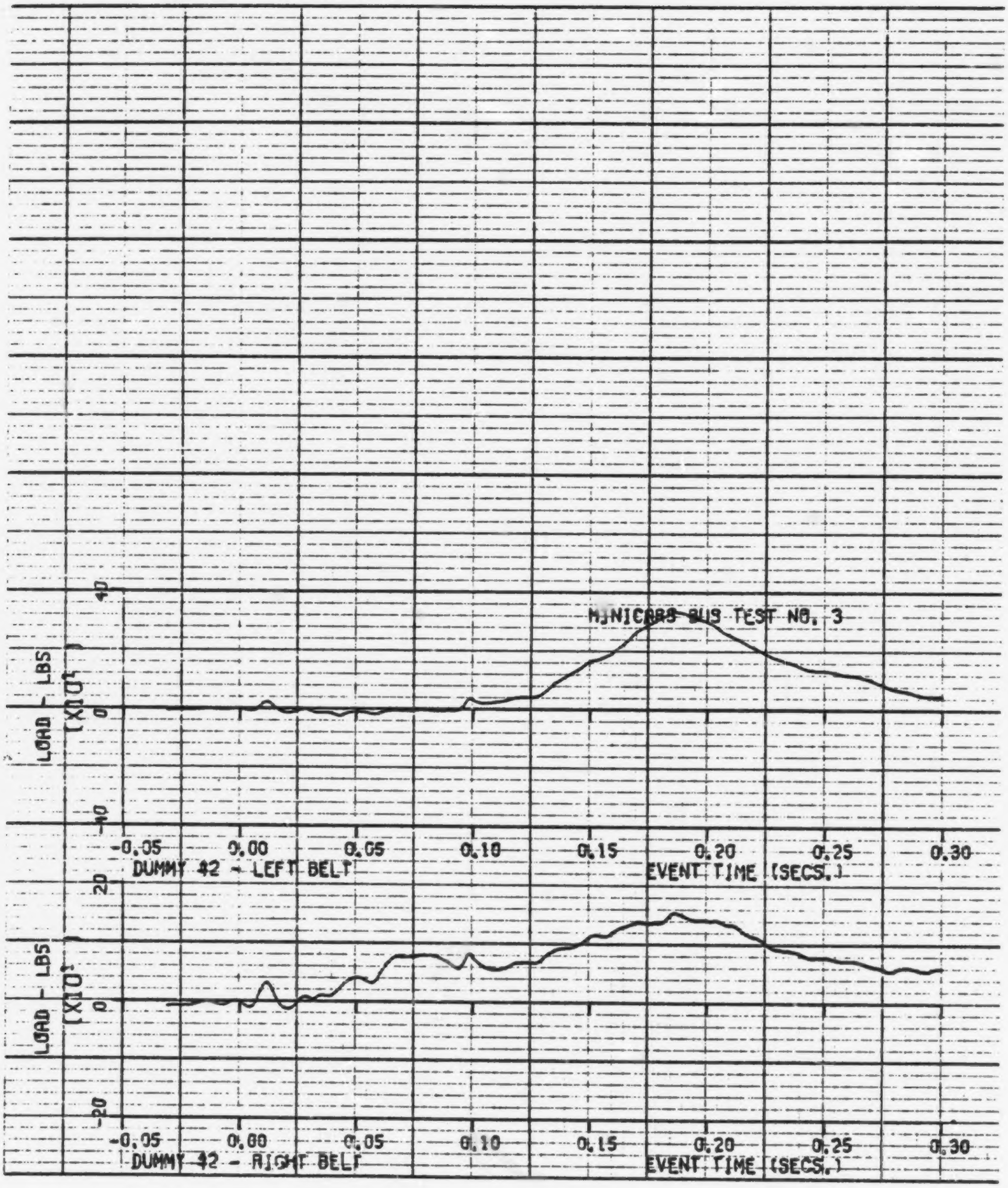
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - Z COMP.
EVENT TIME (SECS.)

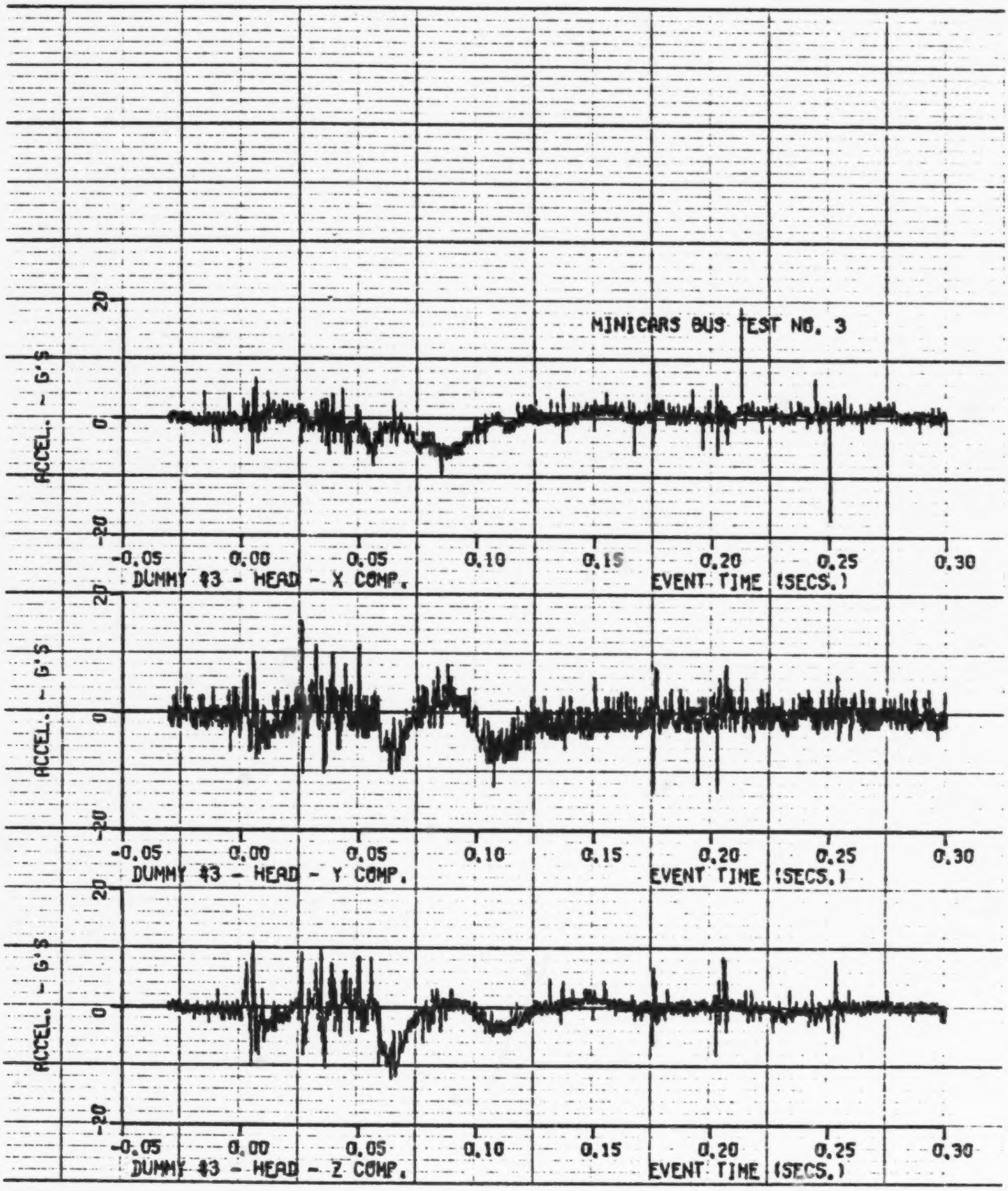
644C-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
(X10^2)
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST
EVENT TIME (SECS.)

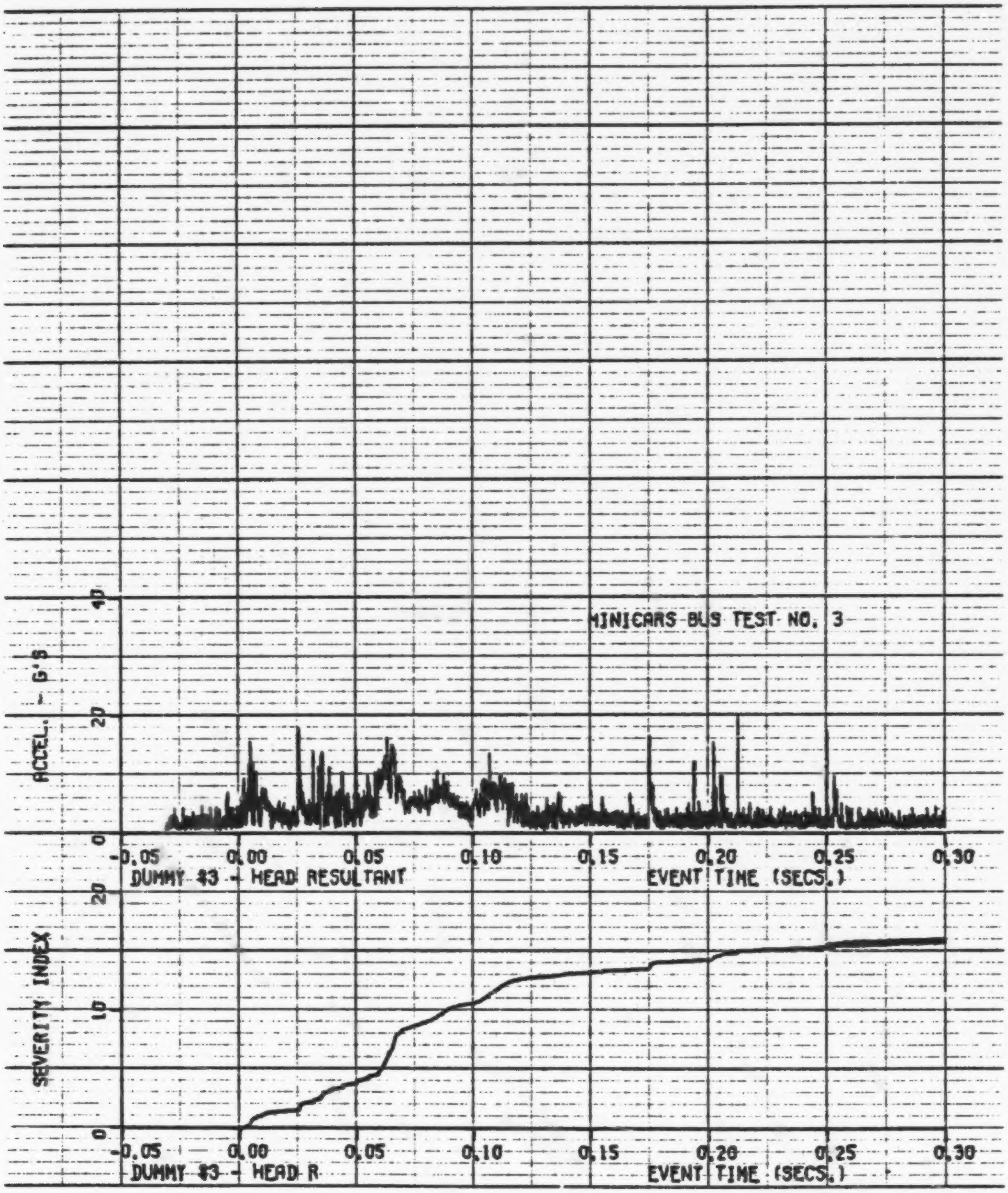
6440-V-2


MINICARS BUS TEST NO. 3
LOAD - LBS
(X10¹)
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY 42 - LEFT BELT
EVENT TIME (SECS.)
LOAD - LBS
(X10¹)
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY 42 - RIGHT BELT
EVENT TIME (SECS.)

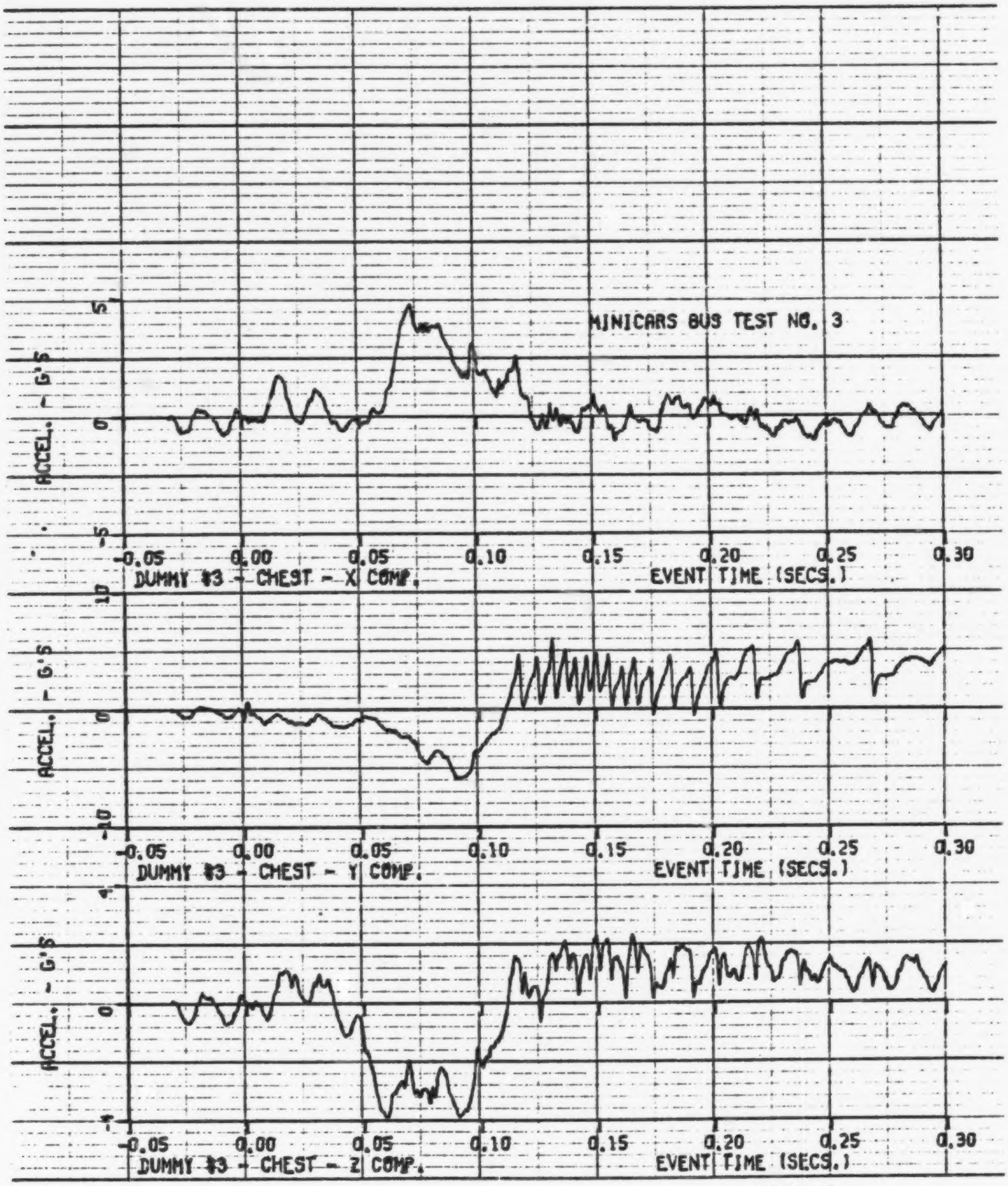
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - HEAD - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - HEAD - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - HEAD - Z COMP.
EVENT TIME (SECS.)

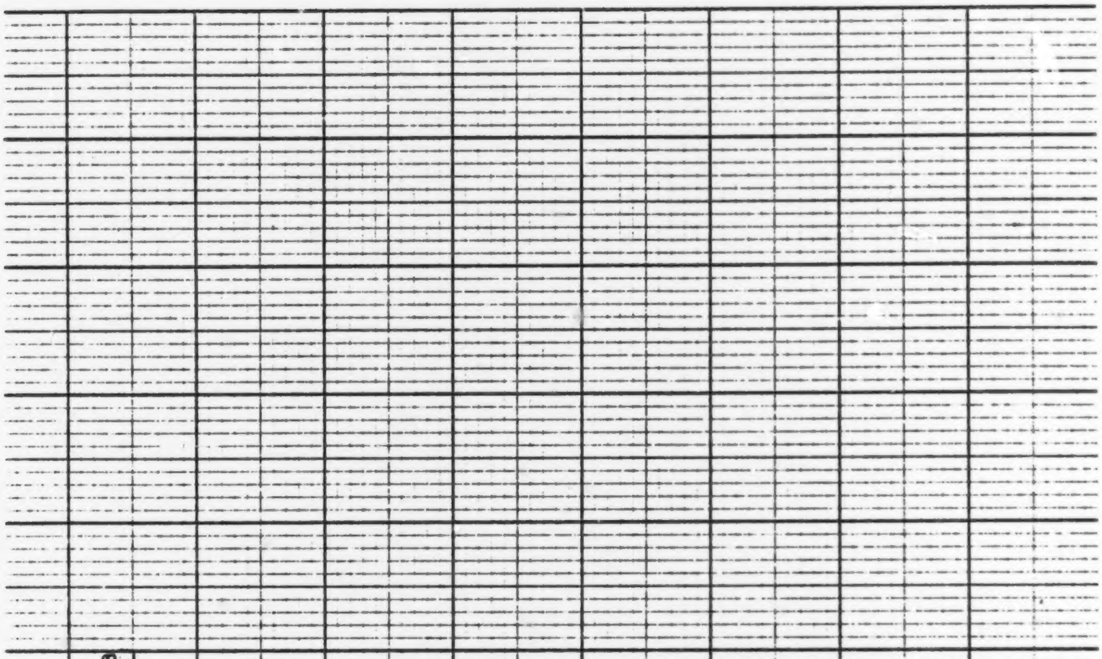
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - HEAD R
EVENT TIME (SECS.)

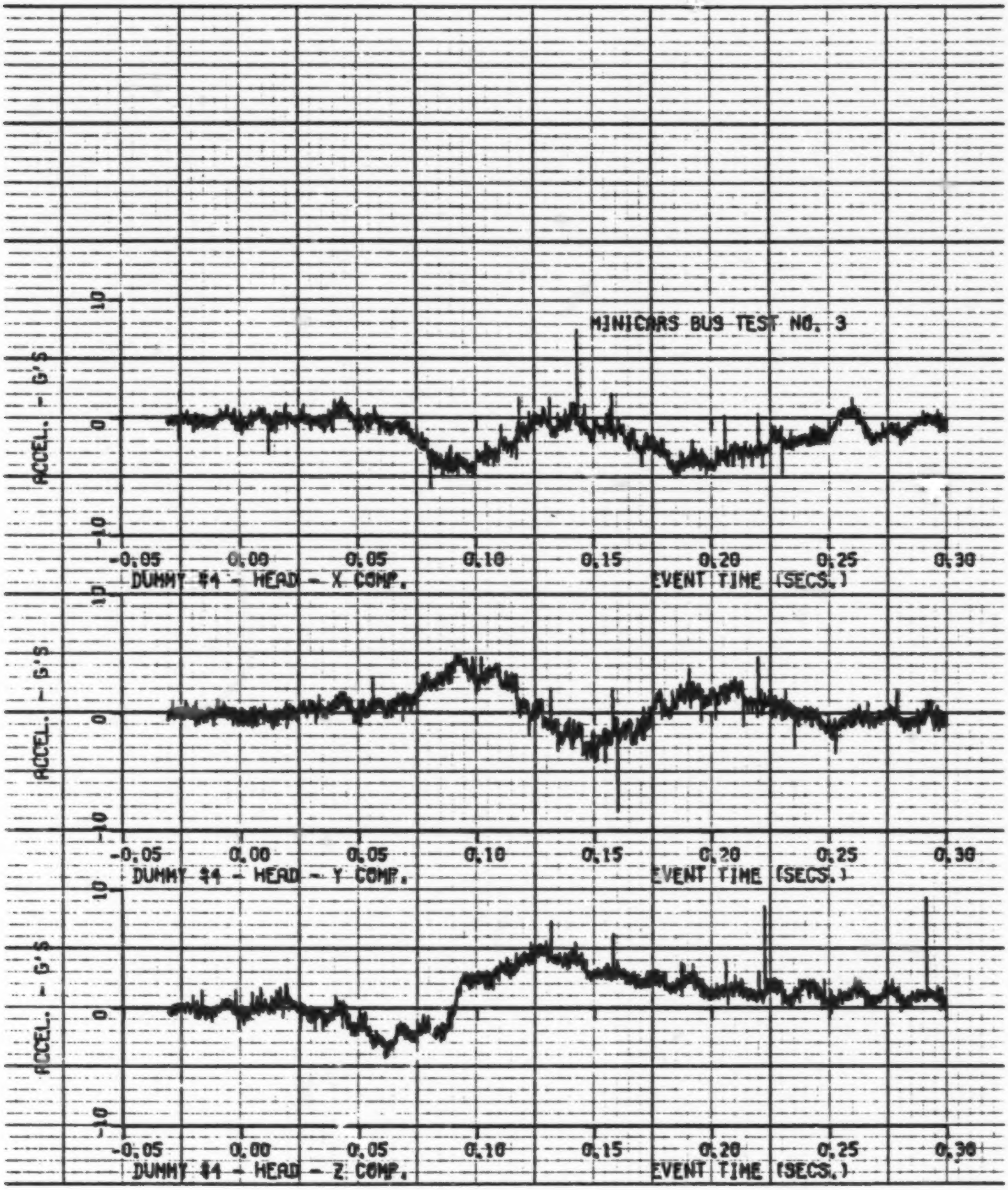
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - Z COMP.
EVENT TIME (SECS.)

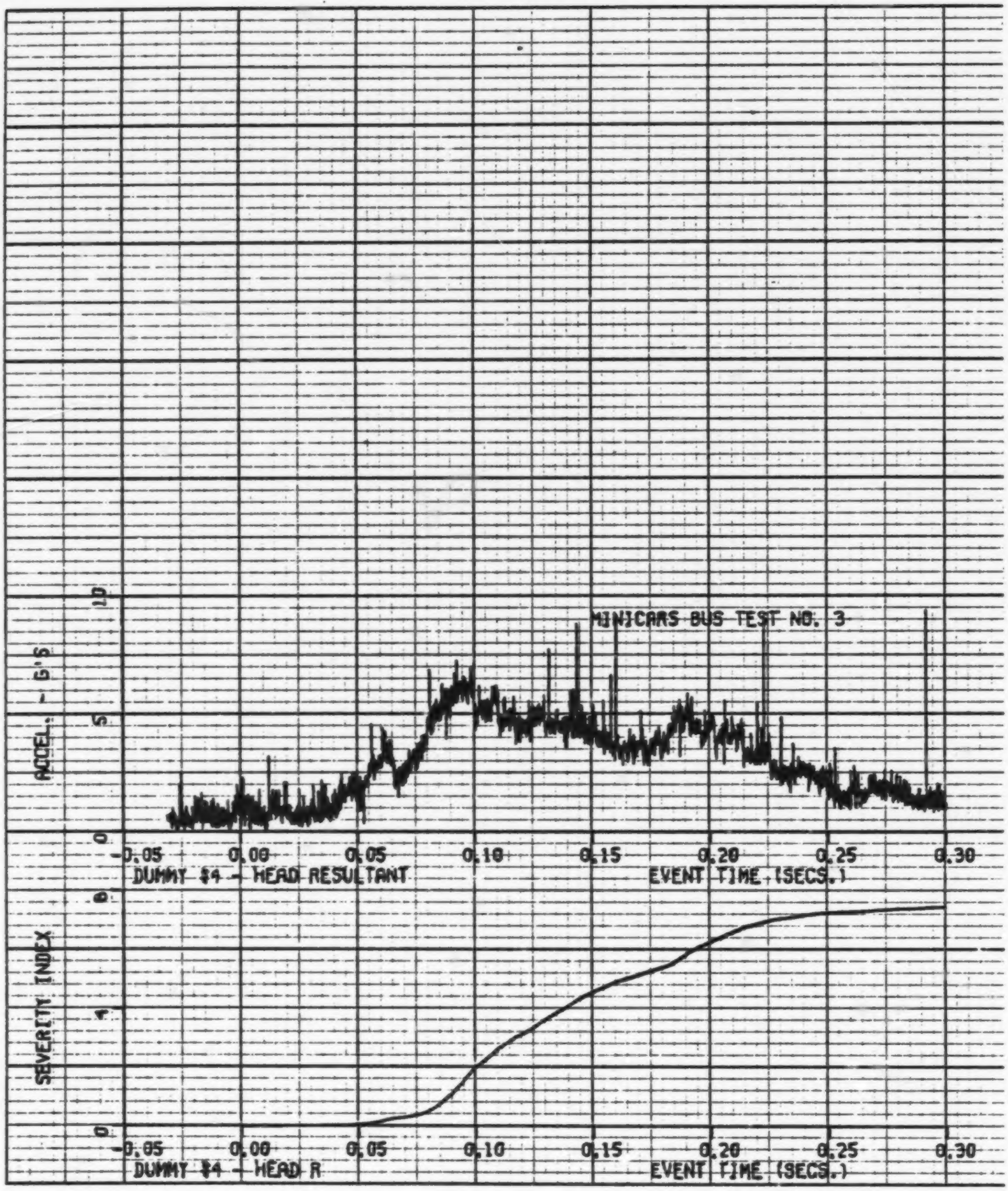
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
8
4
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
10
5
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST
EVENT TIME (SECS.)

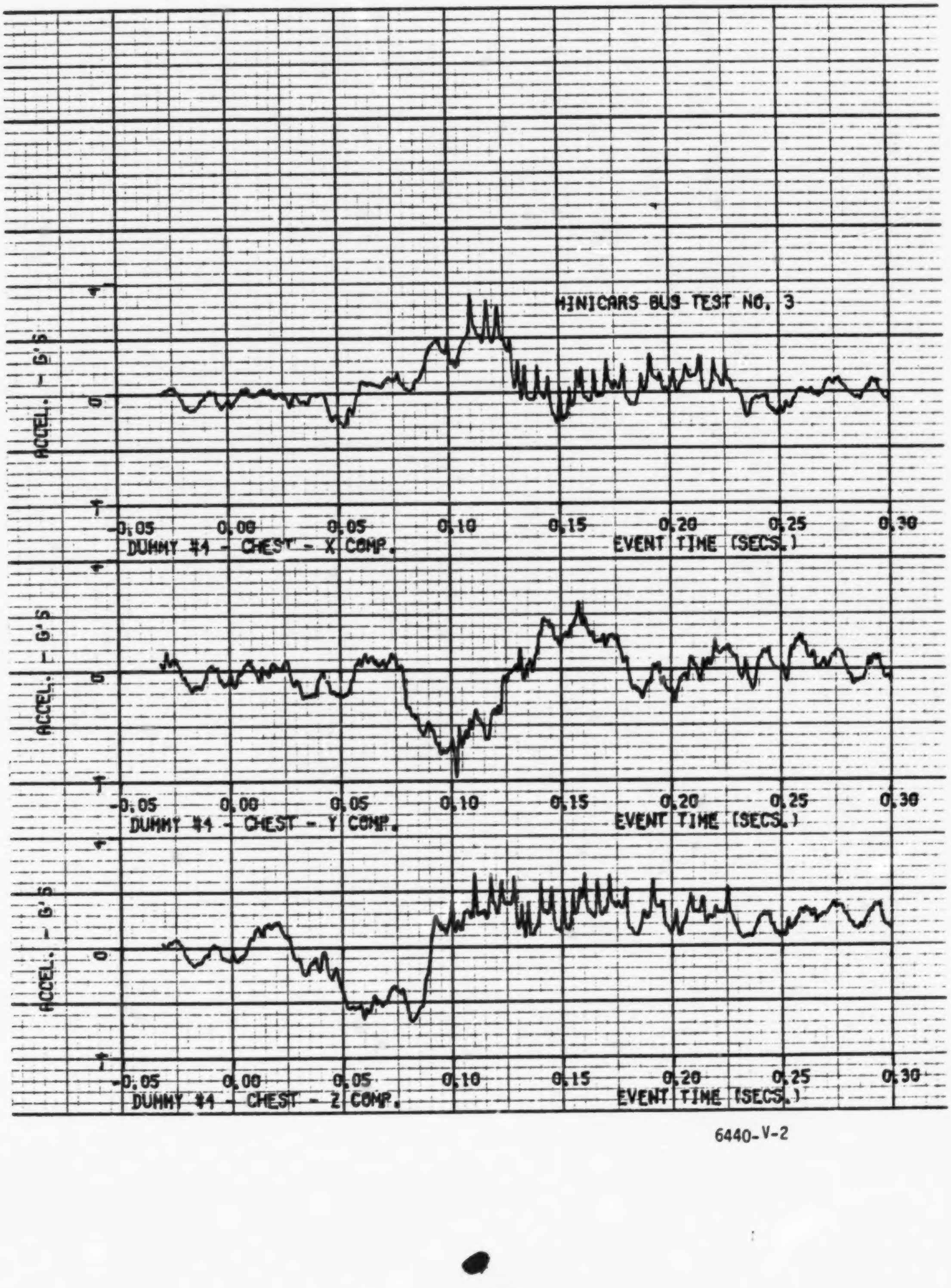
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - HEAD - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - HEAD - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - HEAD - Z COMP.
EVENT TIME (SECS.)

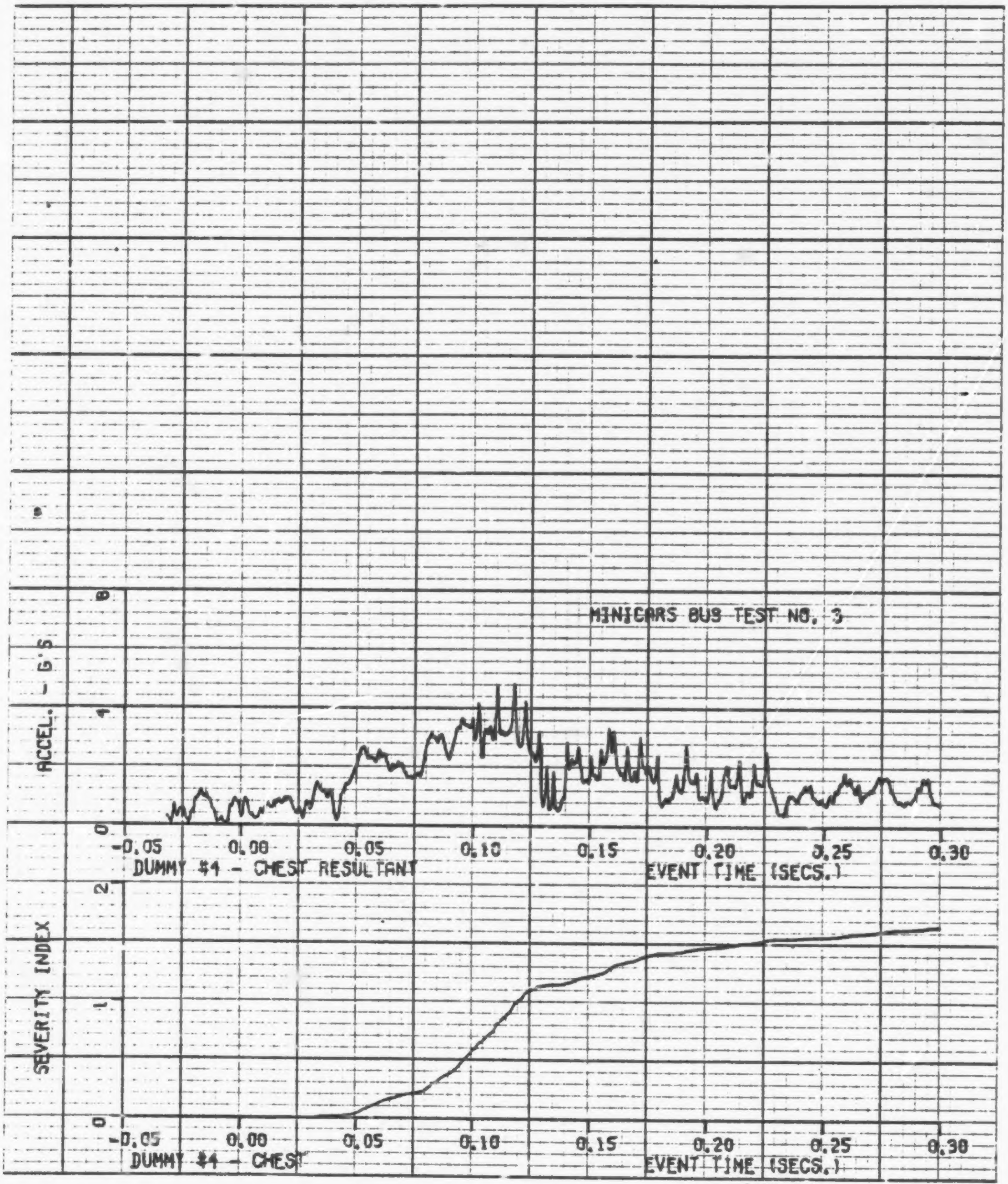
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
10
5
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
8
4
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - HEAD R
EVENT TIME (SECS.)

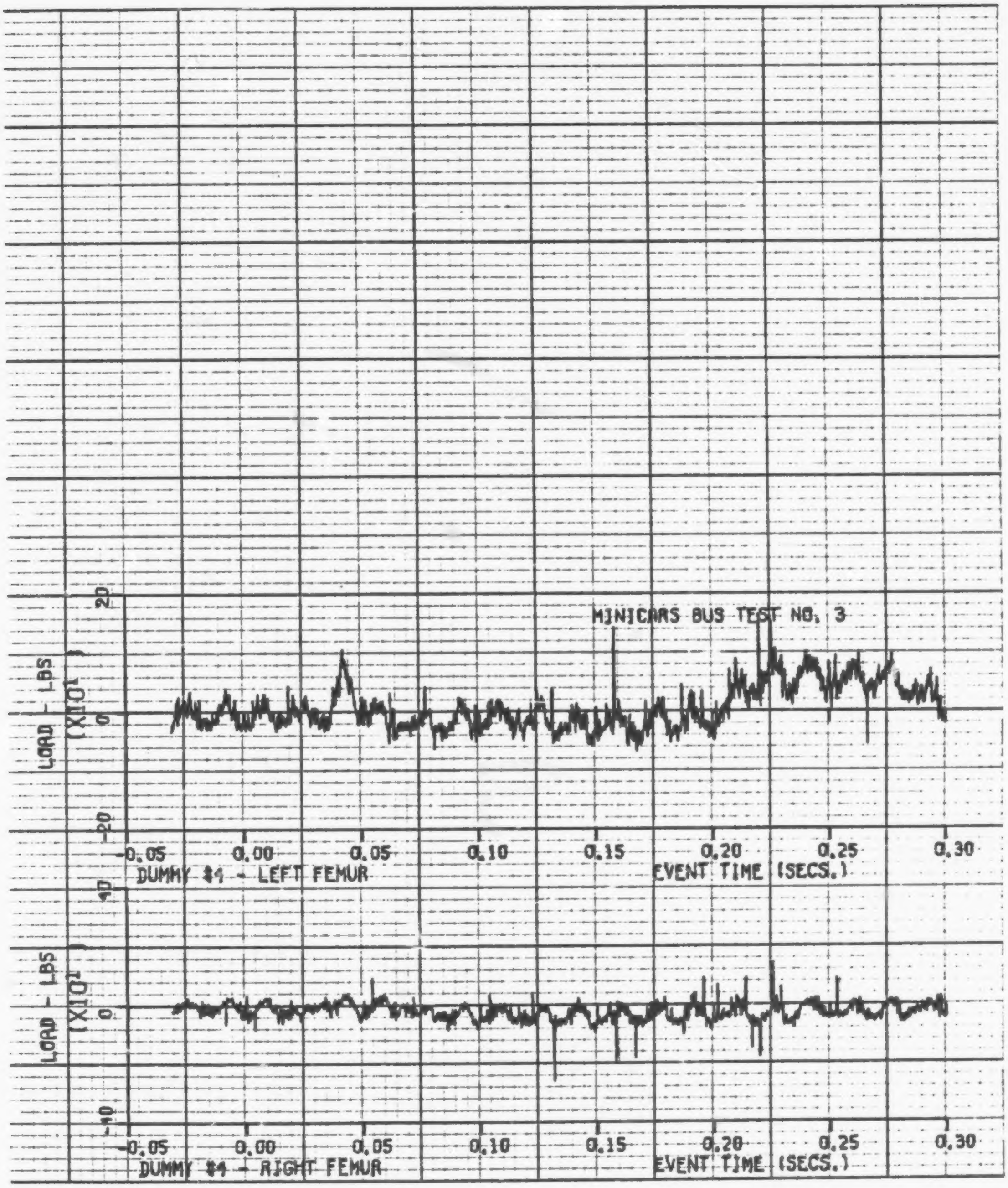
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Z COMP.
EVENT TIME (SECS.)

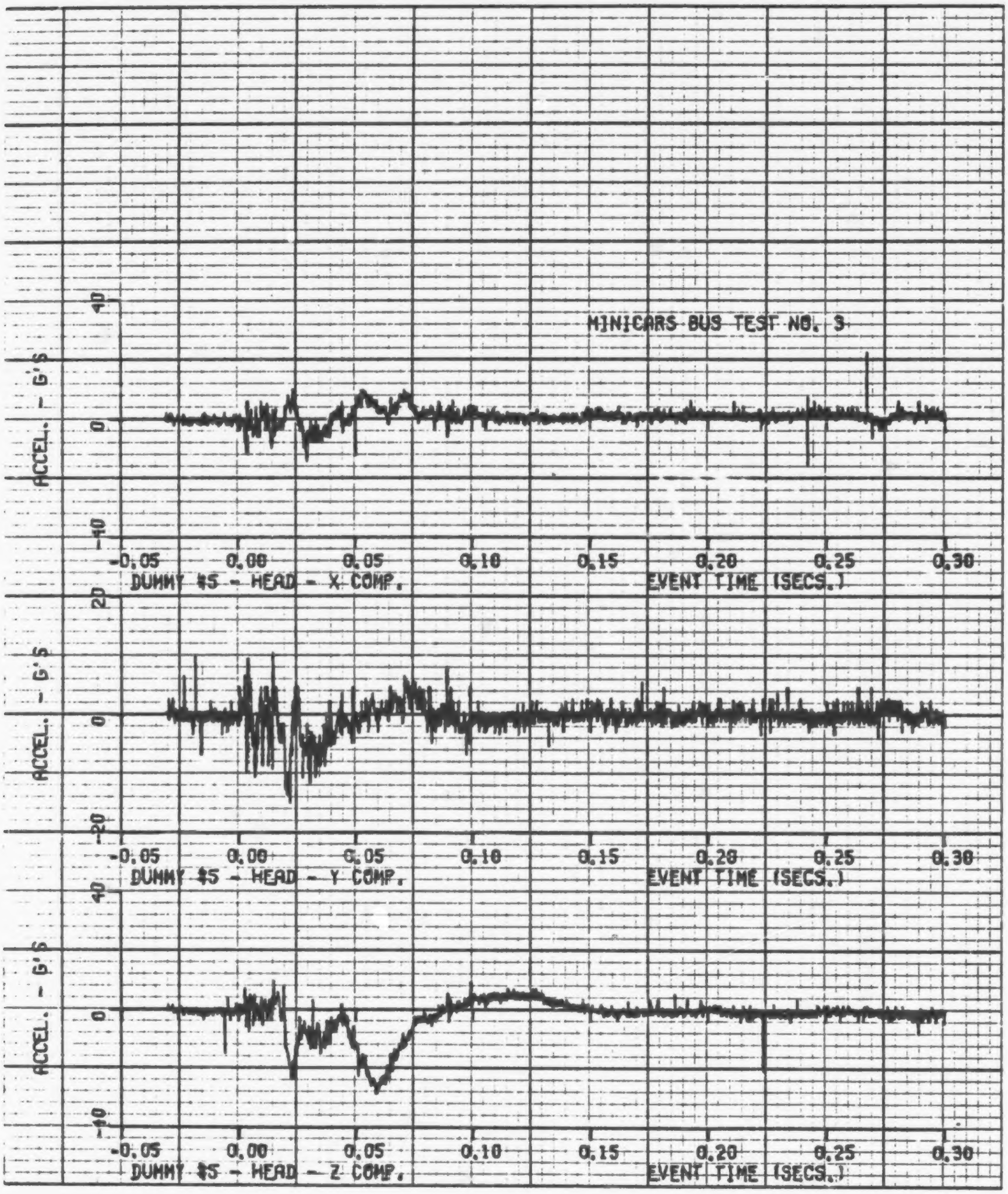
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
8
4
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
2
1
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST
EVENT TIME (SECS.)

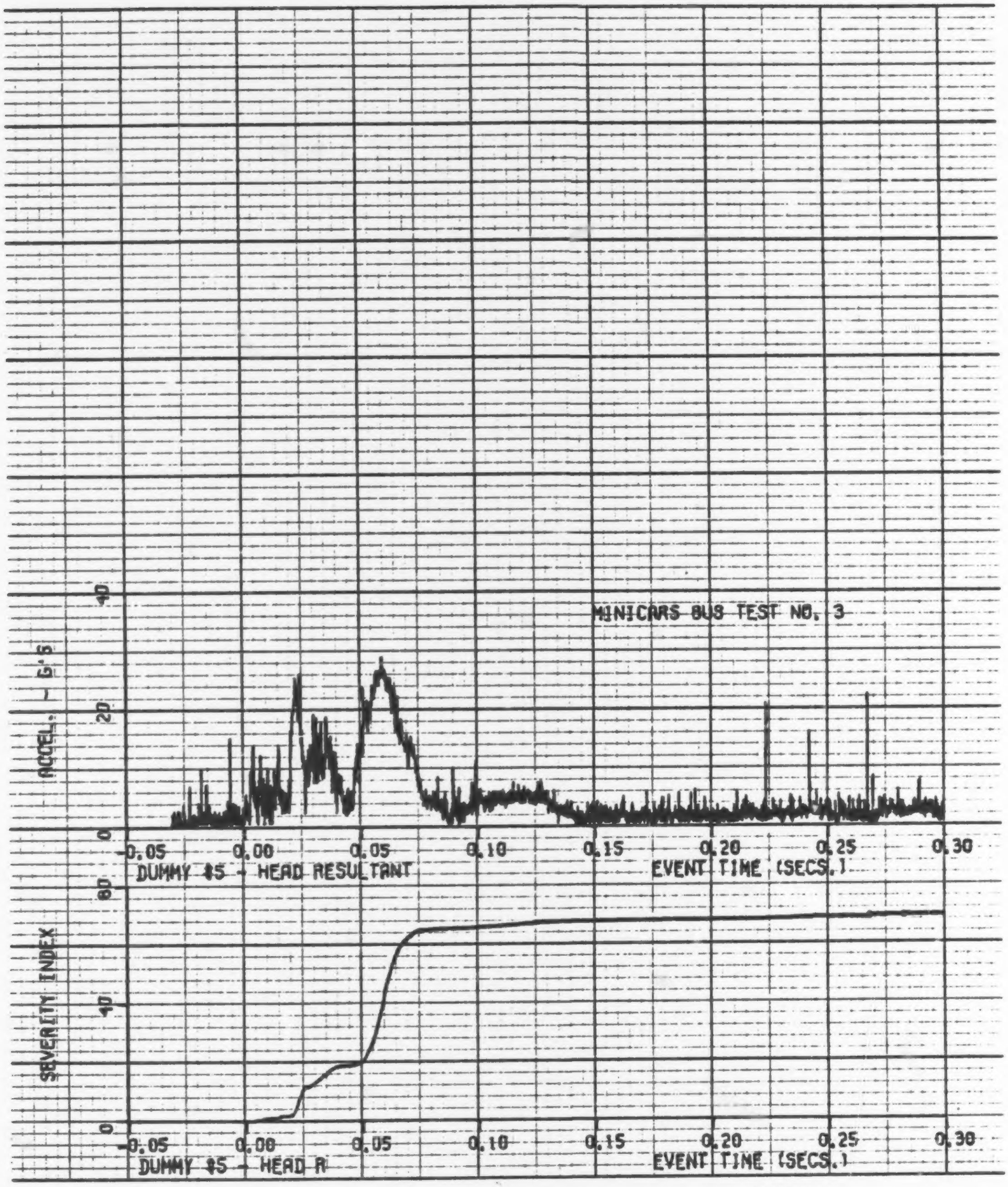
6440-V-2


MINICARS BUS TEST NO. 3
LOAD - LBS (X10¹)
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - LEFT FEMUR
EVENT TIME (SECS.)
LOAD - LBS (X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - RIGHT FEMUR
EVENT TIME (SECS.)

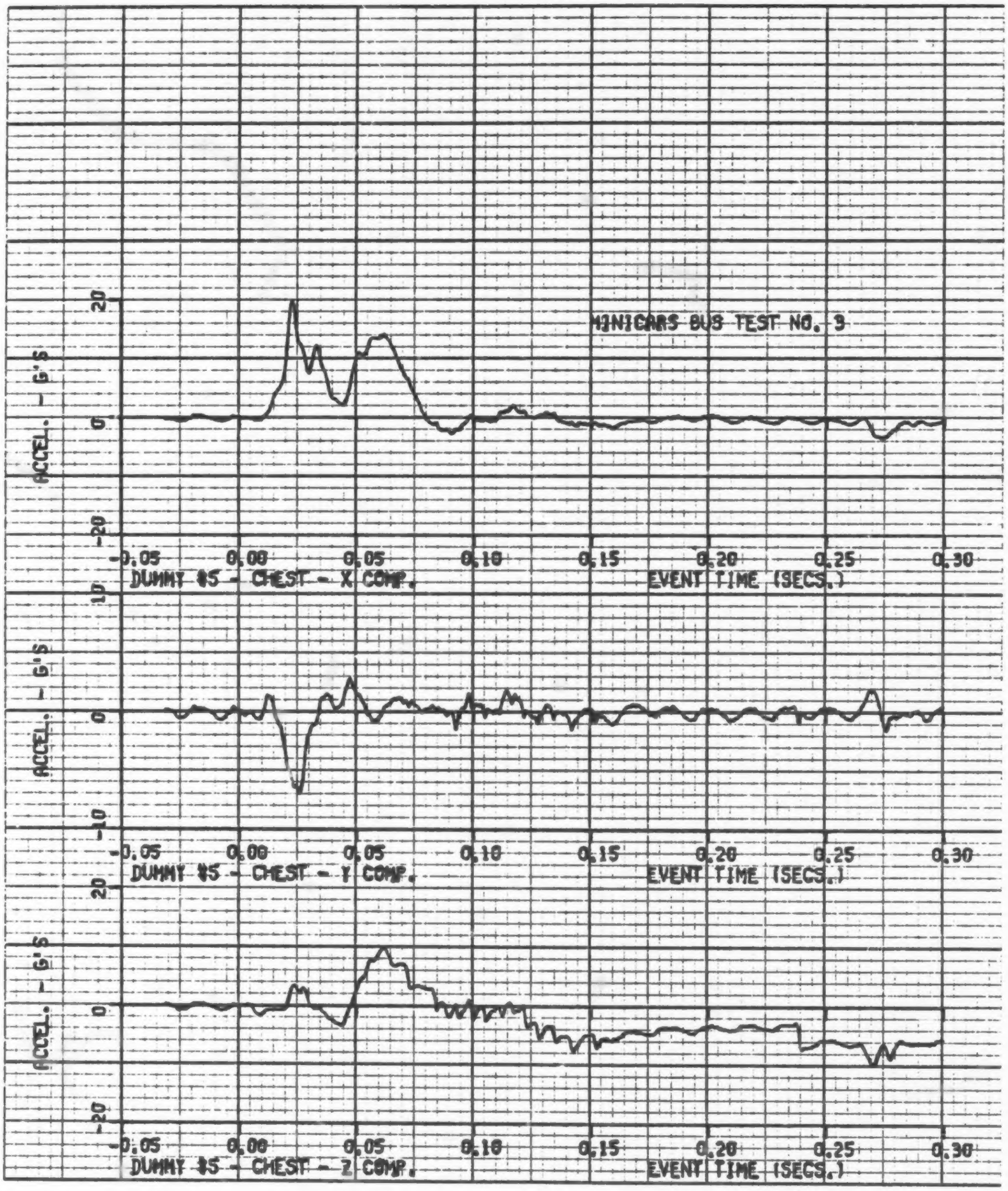
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - HEAD - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - HEAD - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - HEAD - Z COMP.
EVENT TIME (SECS.)

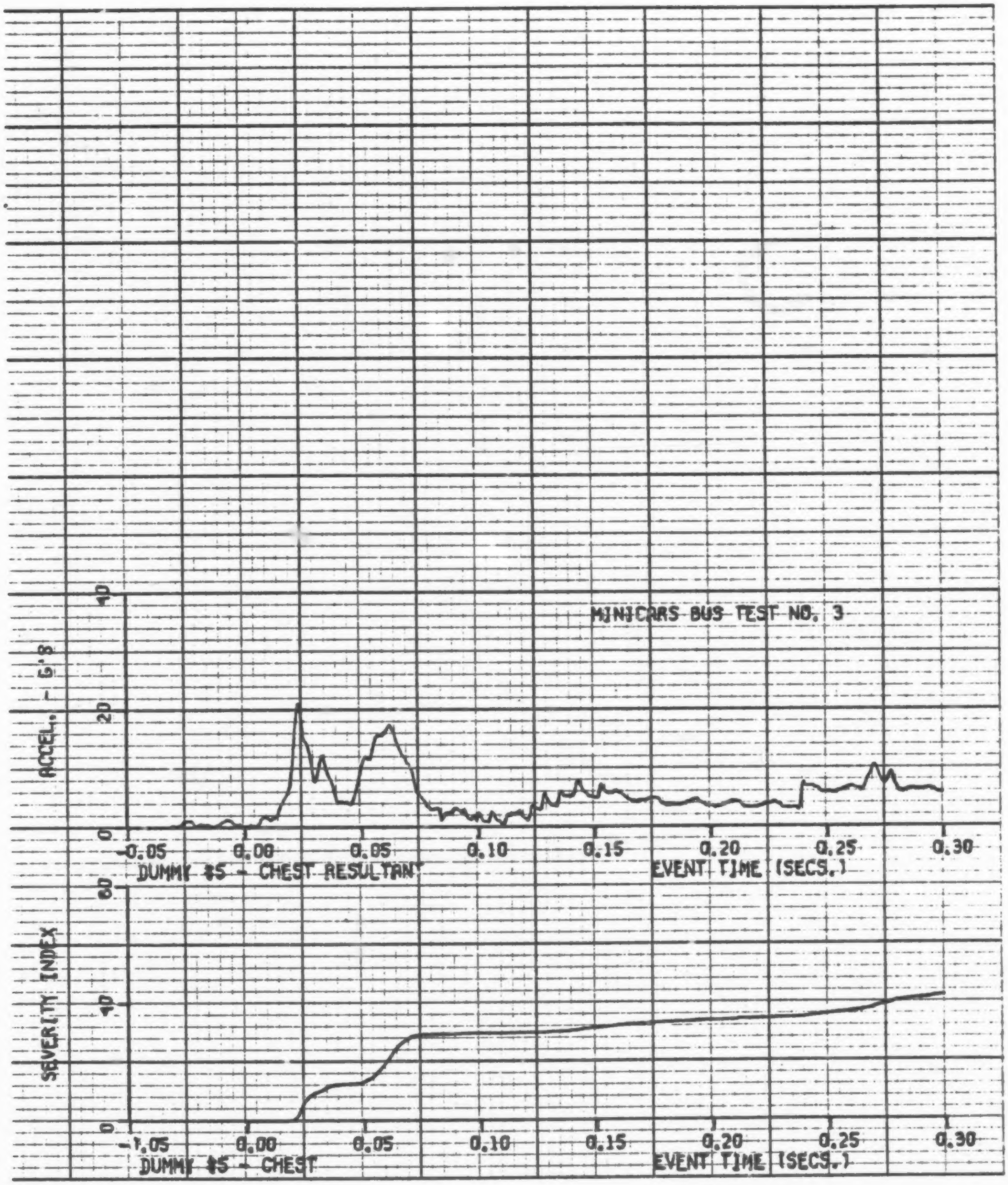
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
80
40
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - HEAD R
EVENT TIME (SECS.)

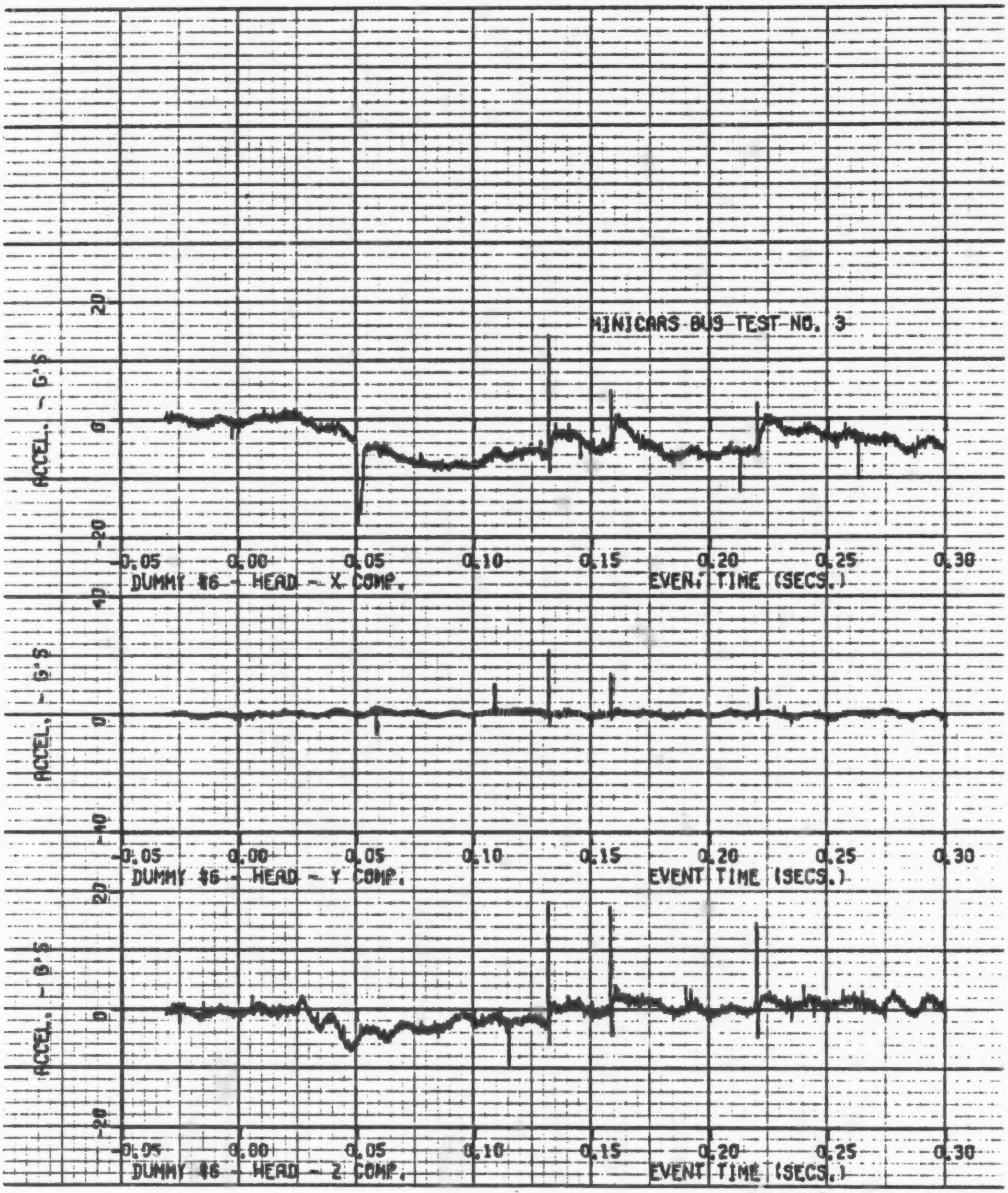
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Z COMP.
EVENT TIME (SECS.)

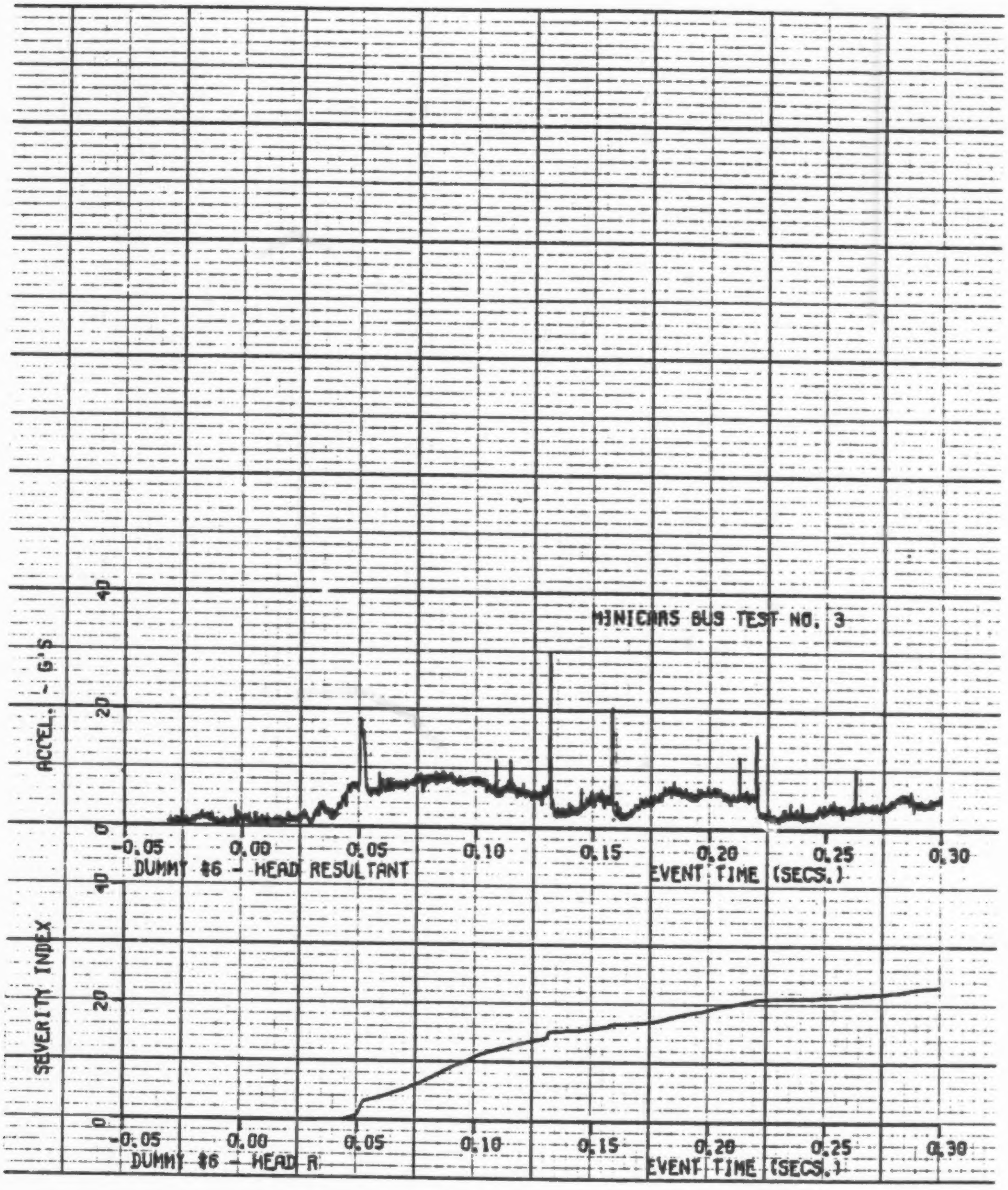
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
60
40
0
-1.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST
EVENT TIME (SECS.)

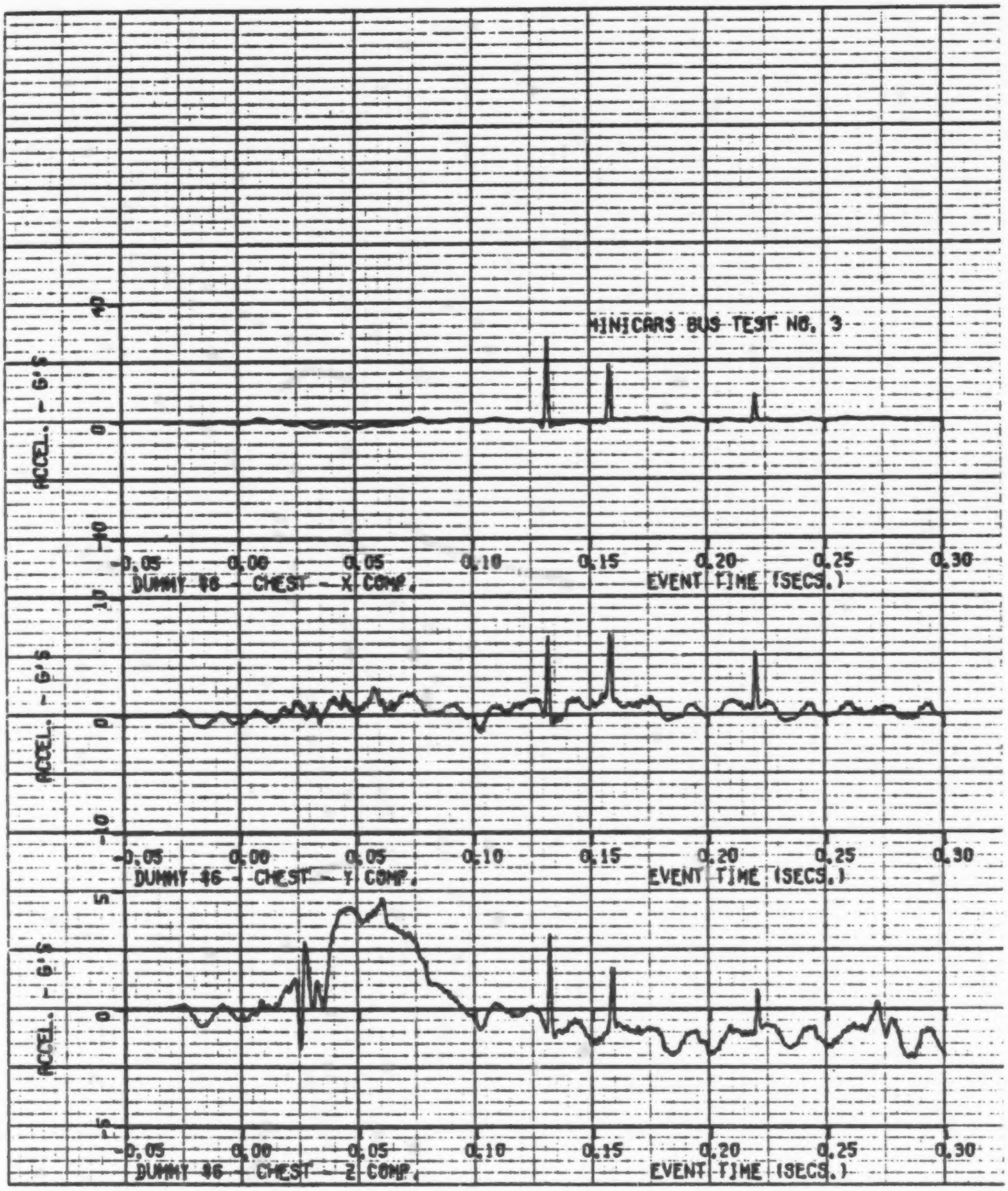
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD - Z COMP.
EVENT TIME (SECS.)

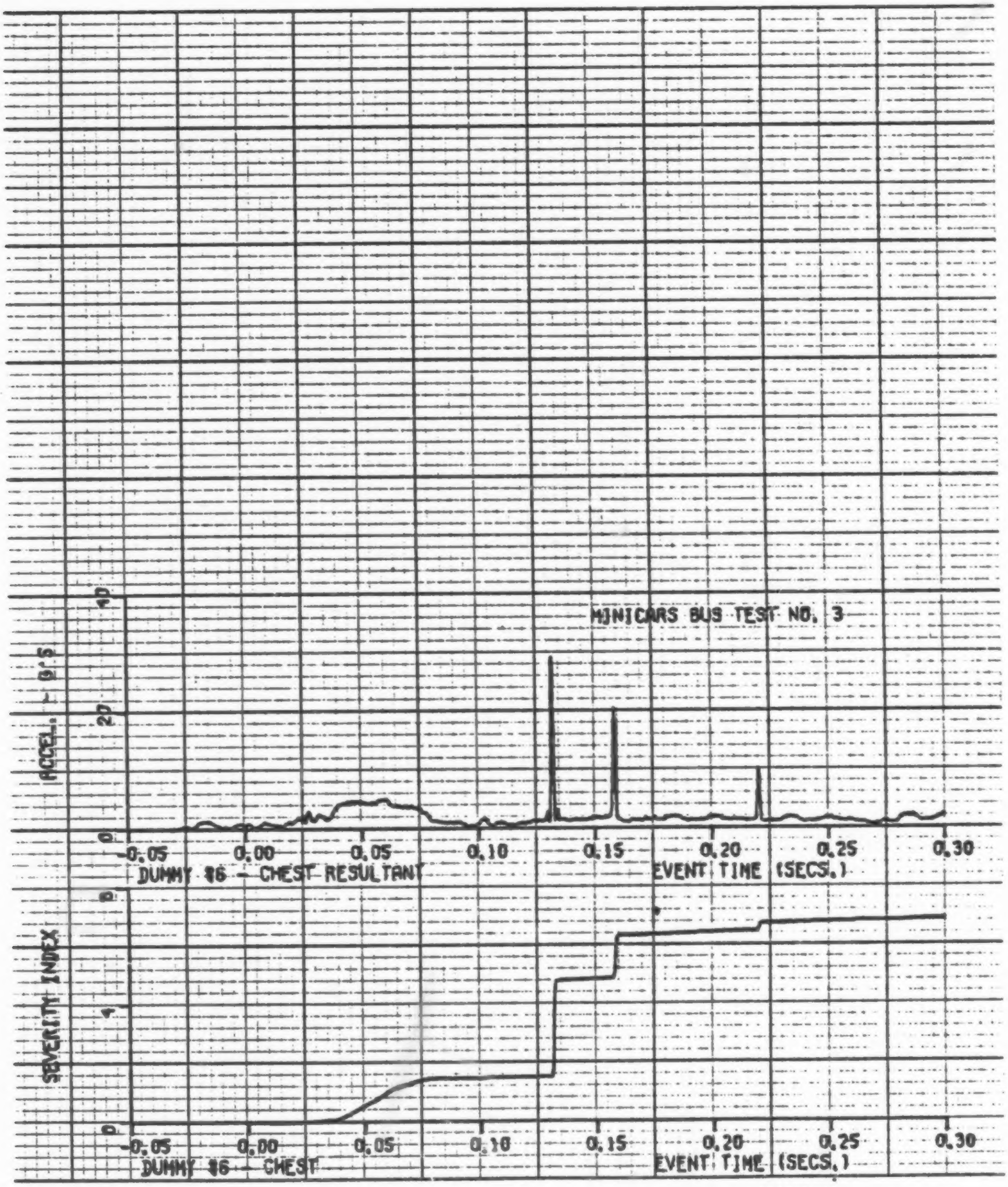
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
0
20
40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
0
20
40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD R
EVENT TIME (SECS.)

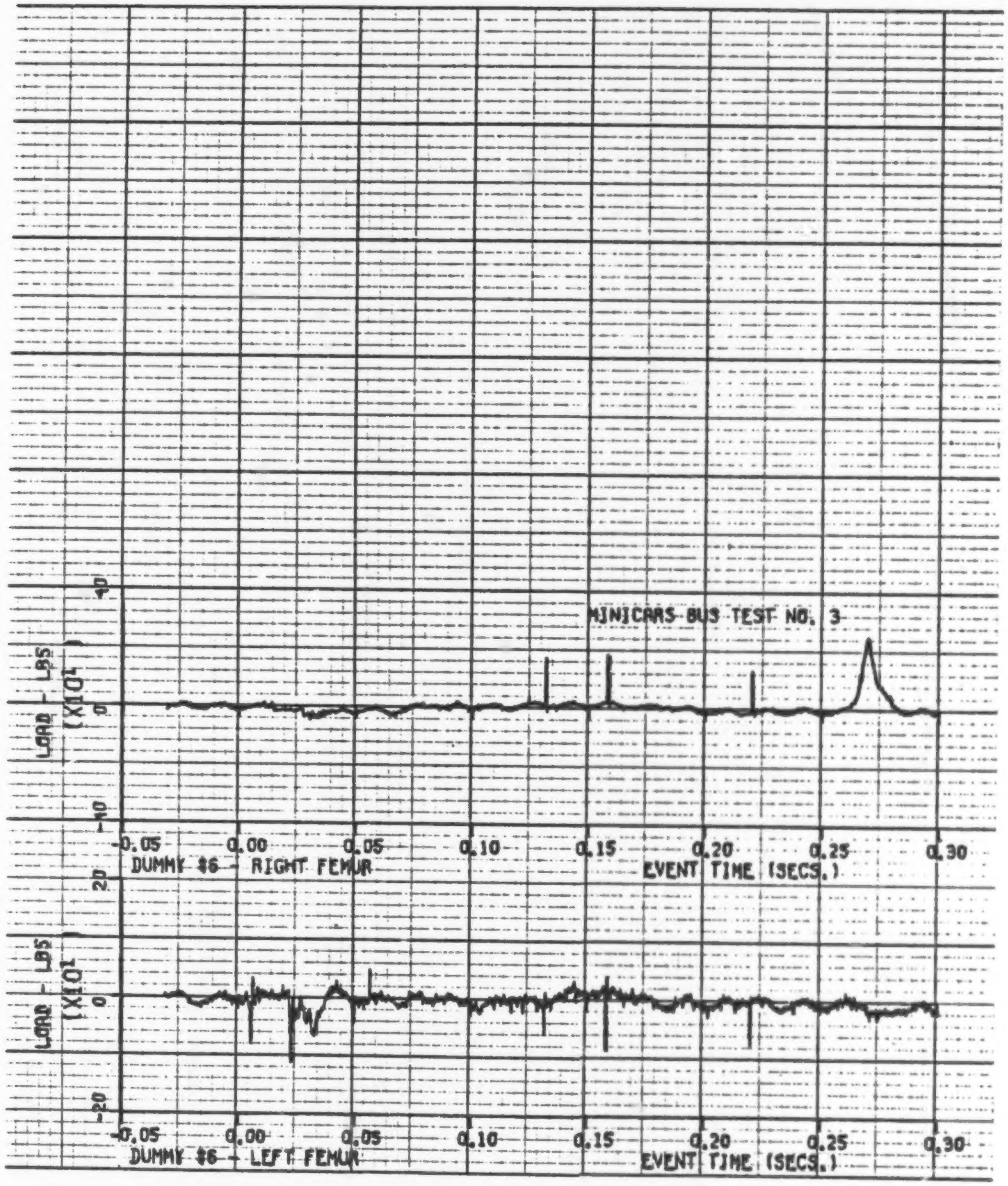
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Z COMP.
EVENT TIME (SECS.)

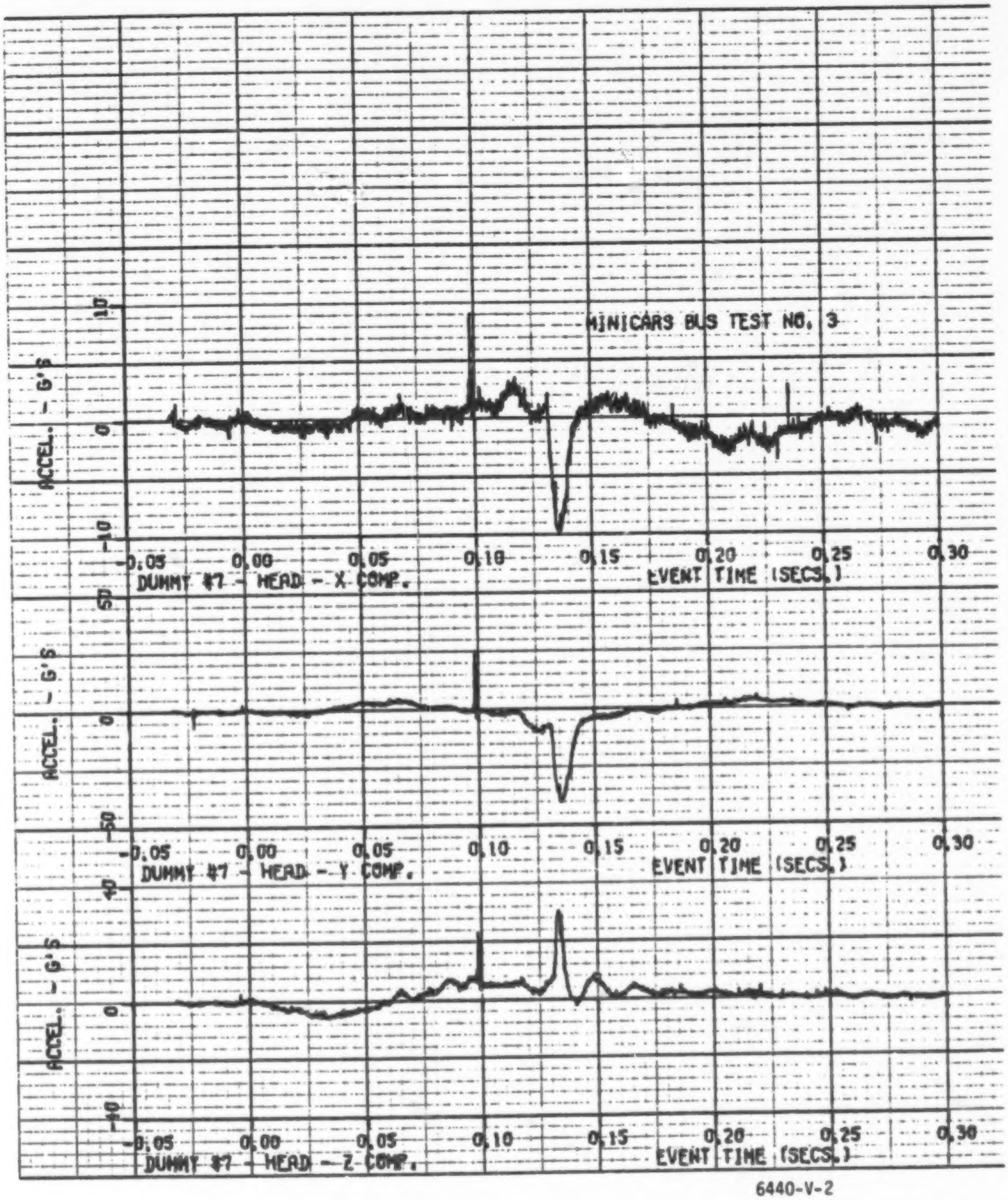
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
8
4
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST
EVENT TIME (SECS.)

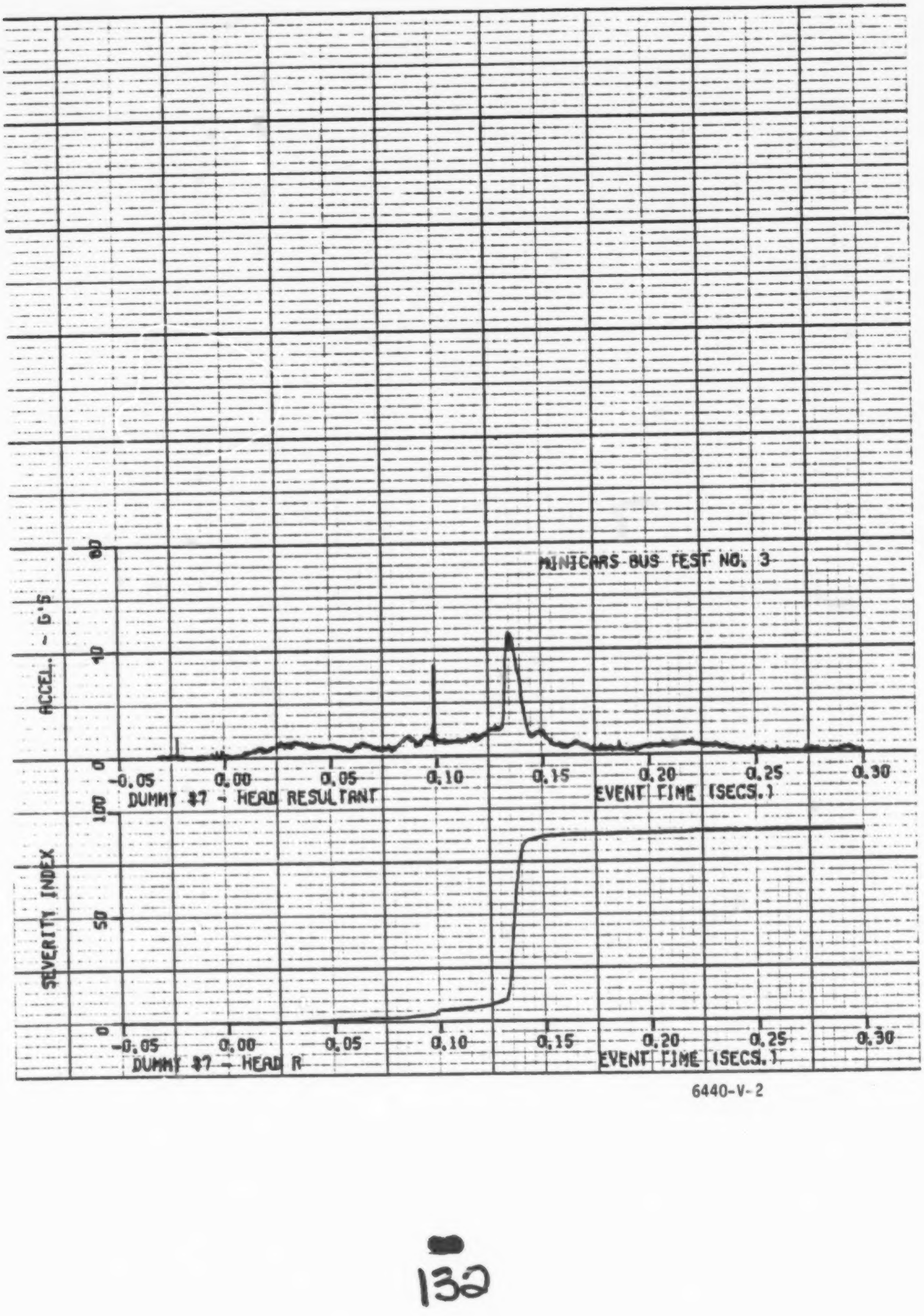
6440-V-2


MINICARS BUS TEST NO. 3
LOAD - LBS
(X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - RIGHT FEMUR
EVENT TIME (SECS.)
LOAD - LBS
(X10¹)
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - LEFT FEMUR
EVENT TIME (SECS.)

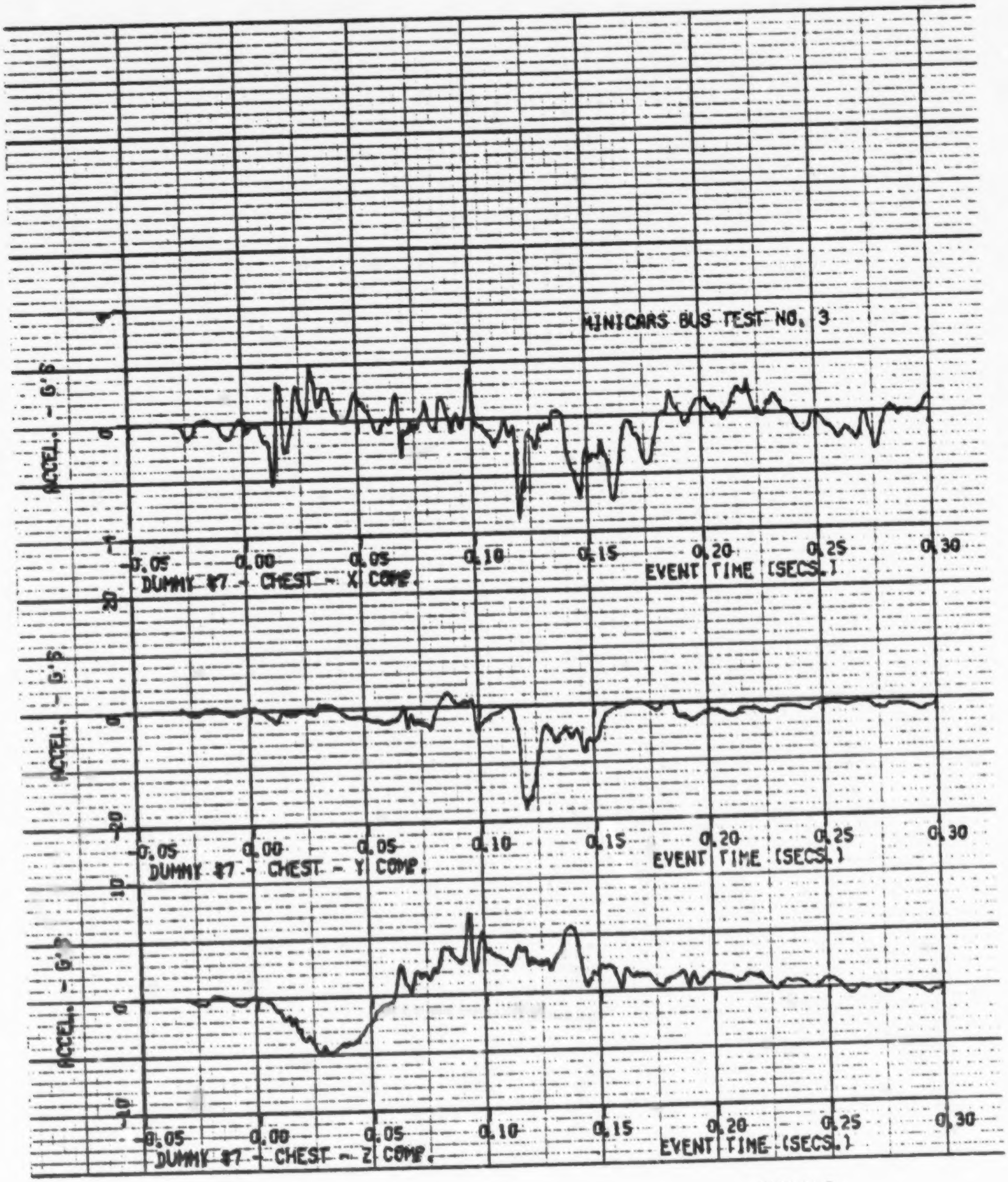
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - HEAD - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
50
0
-50
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - HEAD - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - HEAD - Z COMP.
EVENT TIME (SECS.)

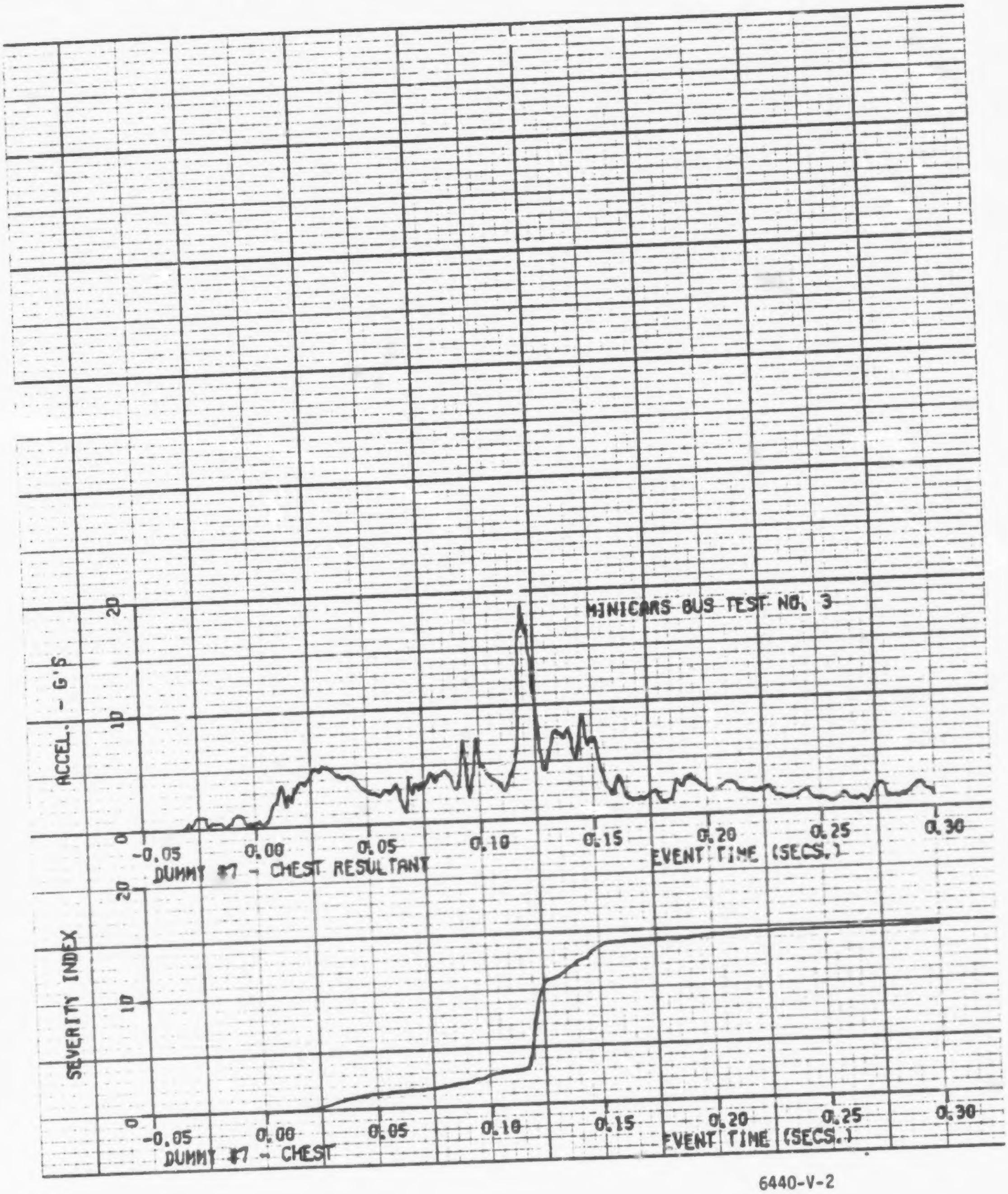
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
80
40
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
100
50
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - HEAD R
EVENT TIME (SECS.)

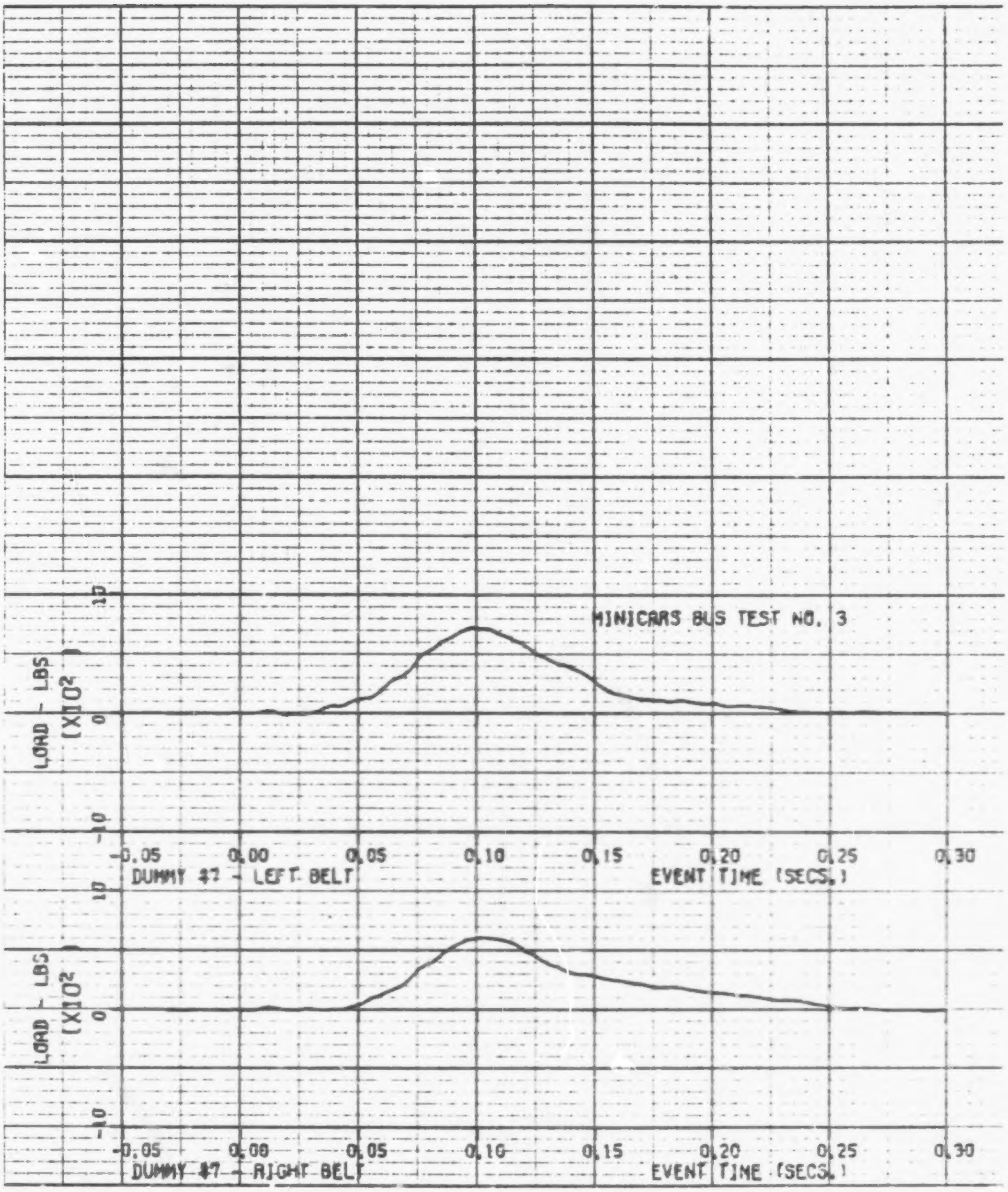
6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
DUMMY #7 - CHEST - X COMP.
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
DUMMY #7 - CHEST - Y COMP.
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
DUMMY #7 - CHEST - Z COMP.

6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S
0
10
20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
DUMMY #7 - CHEST RESULTANT
SEVERITY INDEX
0
10
20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
DUMMY #7 - CHEST

6440-V-2

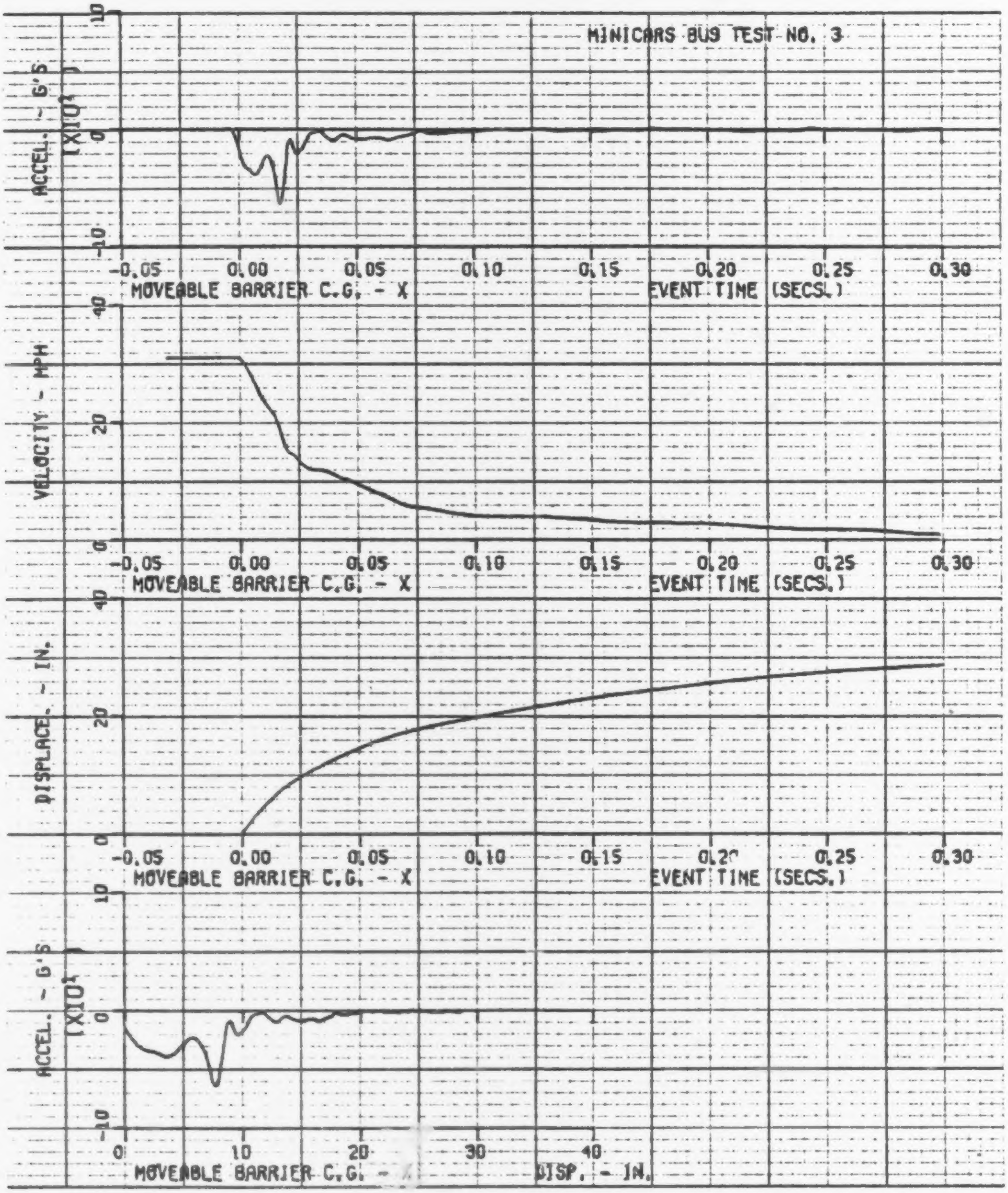

MINICARS BUS TEST NO. 3
LOAD - LBS (X10^2)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - LEFT BELT
EVENT TIME (SECS.)
LOAD - LBS (X10^2)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - RIGHT BELT
EVENT TIME (SECS.)

6440-V-2

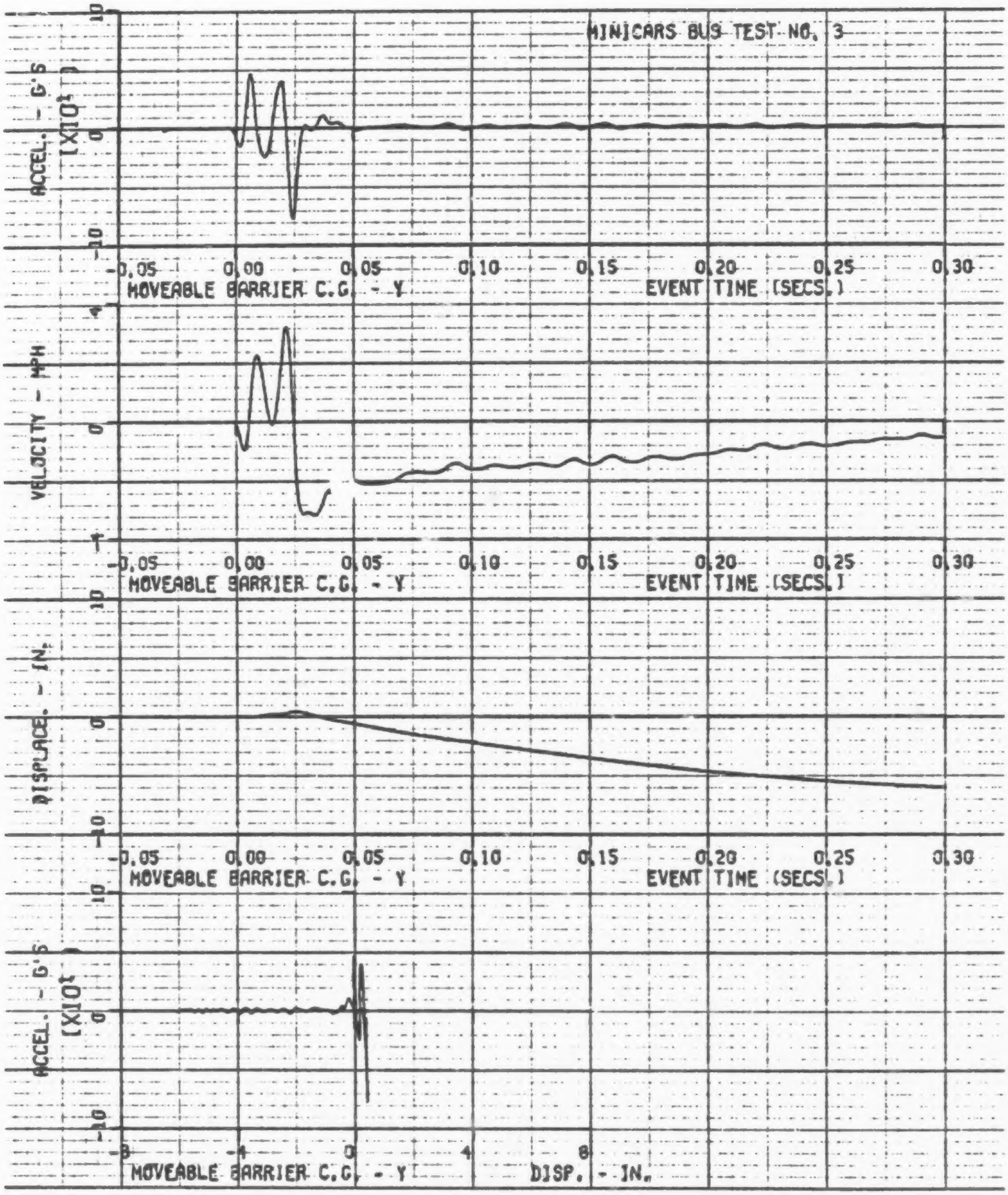
MOVING BARRIER

FILTER CHANNEL CLASS 60

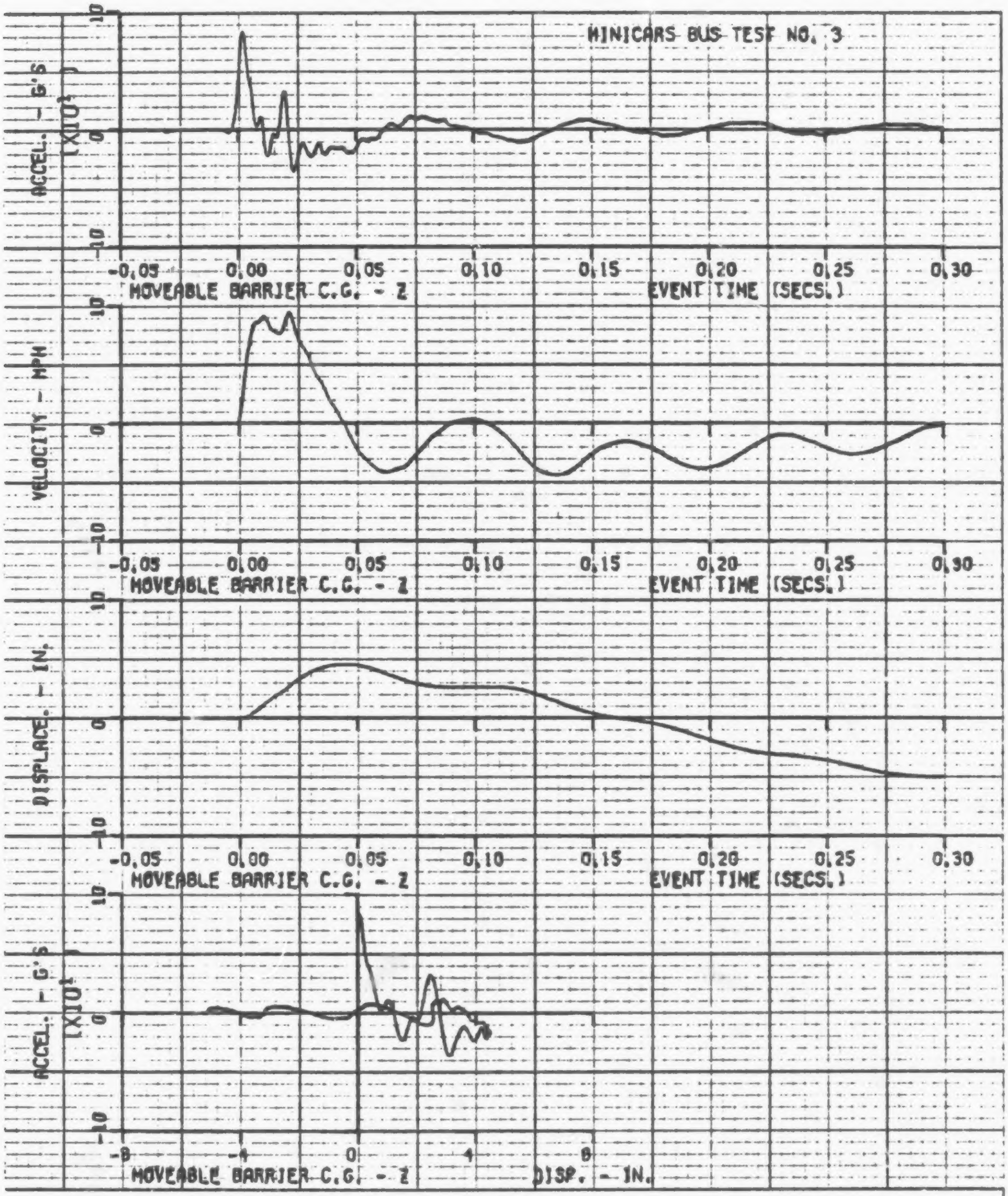
136


MINICARS BUS TEST NO. 3
ACCEL. - G'S (X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
MOVEABLE BARRIER C.G. - X
EVENT TIME (SECS.)
VELOCITY - MPH
40
20
0
DISPLACE. - IN.
40
20
0
0
10
20
30
40
DISP. - IN.

6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S (X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
MOVEABLE BARRIER C.G. - Y
EVENT TIME (SECS.)
VELOCITY - MPH
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
MOVEABLE BARRIER C.G. - Y
EVENT TIME (SECS.)
DISPLACE. - IN.
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
MOVEABLE BARRIER C.G. - Y
EVENT TIME (SECS.)
ACCEL. - G'S (X10¹)
10
0
-10
-8
-4
0
4
8
MOVEABLE BARRIER C.G. - Y
DISP. - IN.

6440-V-2


MINICARS BUS TEST NO. 3
ACCEL. - G'S (X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
MOVEABLE BARRIER C.G. - Z
EVENT TIME (SECS.)
VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
MOVEABLE BARRIER C.G. - Z
EVENT TIME (SECS.)
DISPLACE. - IN.
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
MOVEABLE BARRIER C.G. - Z
EVENT TIME (SECS.)
ACCEL. - G'S (X10¹)
10
0
-10
-8
-4
0
4
8
MOVEABLE BARRIER C.G. - Z
DISP. - IN.

6440-V-2

APPENDIX B

GM TRANSIT BUS CRASH TESTS

BUS CRASH TEST PROGRAM
TEST NO. 4 & TEST NO. 5

Donald A. Alianello
Calspan Report No. 6440-V-3

Prepared for:

MINICARS, INC.
55 DEPOT ROAD
GOLETA, CALIFORNIA 93017

PURCHASE ORDER NO. 5458
IN SUPPORT OF: NHTSA CONTRACT NO. DOT-HS-7-01774

TEST:	**Test No. 4 and Test No. 5** **(G.M. Transit Bus)**
TYPE OF TEST:	**Test No. 4, Frontal Fixed Barrier** **Test No. 5, Moving Barrier Into Side of Bus**
TEST DATE:	**2/28/78 and 3/2/78**

TABLE OF CONTENTS

Page No.

LIST OF FIGURES iii

LIST OF TABLES v

PRESENTATION OF RESULTS 1

TEST OBJECTIVE 2

GENERAL COMMENTS - TEST NO. 4 4

GENERAL COMMENTS - TEST NO. 5 20

APPENDIX 1 - TEST NO. 4 DATA 35

APPENDIX 2 - TEST NO. 5 DATA 105

142

LIST OF FIGURES

Figure No.		Page No.
1	VEHICLE DIMENSION AND PHOTOGRAPHIC TARGETS FOR FRONTAL BARRIER AND MOVING BARRIER TESTS	8
2	PRE-TEST NO. 4 - TRANSIT BUS (G.M.) EXTERIOR, FRONTAL BARRIER TEST	9
3	POST-TEST NO. 4 - TRANSIT BUS (G.M.) EXTERIOR, FRONTAL BARRIER TEST	10
4	PRE-TEST NO. 4 - TRANSIT BUS (G.M.) INTERIOR, FRONTAL BARRIER TEST	11
5	POST-TEST NO. 4 - TRANSIT BUS (G.M.) INTERIOR, FRONTAL BARRIER TEST	12
6	WHEELCHAIR AND BELT ATTACHMENTS EMPLOYED ON TRANSIT BUS (G.M.) TEST	13
7	ACCELEROMETER LOCATIONS - TEST NO. 4 - FRONTAL BARRIERS	14
8	DUMMY SEATING POSITION AND INSTRUMENTATION FOR FRONTAL BARRIERS TEST NO. 4	15
9	PRE- AND POST-TEST NO. 4 - DUMMY LOCATIONS	16
10	ON-BOARD CAMERA COVERAGE FOR TEST NO. 4	17
11	OFF-BOARD CAMERA COVERAGE FOR TEST NO. 4	18
12	PRE- AND POST-TEST NO. 5 - TRANSIT BUS (G.M.) EXTERIOR, MOVING BARRIER TEST	23
13	POST-TEST NO. 5 - TRANSIT BUS (G.M.) EXTERIOR, MOVING BARRIER TEST	24
14	PRE-TEST NO. 5 - TRANSIT BUS (G.M.) INTERIOR, MOVING BARRIER TEST	25
15	POST-TEST NO. 5 - TRANSIT BUS (G.M.) INTERIOR MOVING BARRIER TEST	26

LIST OF FIGURES (Cont.)

Figure No.		Page No.
16	SIDE INTRUSION MEASUREMENTS	27
17	VEHICLE MOTION	27
18	WHEELCHAIR ATTACHMENT	28
19	ACCELEROMETER LOCATIONS - TEST NO. 5 MOVING BARRIER	30
20	DUMMY SEATING POSITIONS AND INSTRUMENTATION FOR MOVING BARRIER - TEST NO. 5	31
21	PRE- AND POST-TEST NO. 5 - DUMMY LOCATIONS	32
22	ON-BOARD CAMERA COVERAGE FOR TEST NO. 5	33
23	OFF-BOARD CAMERA COVERAGE FOR TEST NO. 5	34

LIST OF TABLES

Table No.		Page No.
1	CRASH TEST SUMMARY - TEST NO. 4	3
2	DUMMY INJURY CRITERIA VALUES - TEST NO. 4	5
3	BUS TEST WEIGHTS - TEST NO. 4	6
4	POST-CRASH DATA SHEET - TEST NO. 4	7
5	CRASH TEST SUMMARY - TEST NO. 5	19
6	DUMMY INJURY CRITERIA VALUES - TEST NO. 5	21
7	BUS AND BARRIER TEST WEIGHTS - TEST NO. 5	22
8	EXTERNAL SIDE INTRUSION MEASUREMENTS - TEST NO. 5	29

BLANK PAGE

PRESENTATION OF RESULTS

This test report presents all the test results obtained from Test No. 4 (Frontal Barrier Impact) and Test No. 5 (Moving Barrier Impact). These tests were performed on February 28 and March 2, 1979 at Calspan's Crash Test Facility in Buffalo, New York. The test vehicle was a General Motors Transit Bus.

Included in this document are still photographs of pre- and post-test conditions of the test vehicle and dummies. Dummy identification and pre- and post-test positions of all dummies are presented. Instrumentation identification and locations of all transducers for all electronic data are presented along with dummy and vehicle data in a plotted format. High speed camera locations and camera speeds are listed in table form.

TEST OBJECTIVE

The principal objective in performing the full-scale crash tests on the G.M. Transit Bus was to obtain a deceleration crash pulse for the vehicle and to provide a crash environment to test the following parameters:

- Performance of the wheelchair tiedown attachments as shown in Figure 6.
- acquire injury criteria data on the on-board dummies,
- obtain trajectory information on the on-board dummies.

TABLE 1

CRASH TEST SUMMARY

TEST NO. 4

PROJECT MINICARS BUS TEST

DATE 2/28/79

TIME 15:10

TEMP. 47°F

TEST CONDITION FRONTAL PERPENDICULAR FIXED BARRIER (20 MPH)

VEHICLE NO. 1 G.M. SCHOOL BUS

	VEH. NO. 1
TEST WEIGHT (lbs)	21,440
IMPACT ANGLE (deg)*	0
IMPACT VELOCITY (mph)**	21.09
MAX. CRUSH (in)	28.4

DUMMIES	**VEH. NO. 1**
TYPE	5 - PART 572, HYBRID II 1 - 95% and 1 - 6-YR. OLD
LOCATION	SEE FIGURE 8
RESTRAINT	SEE FIGURE 8

NUMBER OF DATA CHANNELS 72

NUMBER OF HIGH SPEED CAMERAS 12 and ONE REAL TIME

---

*WITH RESPECT TO TOW TRACK CENTERLINE

**SPEED TRAP MEASUREMENT (±0.5% ACCURACY)

GENERAL COMMENTS - TEST NO. 4

- All camera's functioned properly except camera No. 8 which did not run. (See Figure 10.)
- Photographic lighting went out after impact; the reason was not determined and the fault could not be found.
- Floor under driver's seat split and moved upward.
- Floor under side facing seat aft of driver's seat moved forward and under floor that supported driver's seat.
- Barrier behind driver's seat moved forward into back of driver's seat. The roof attachment of the barrier pulled out at roof.
- Roof over driver buckled Crush mode over driver's seat was quite different from over access door on other side of vehicle.
- Access door was jammed during impact and was not useable after impact.
- Floor of vehicle aft of front facing seat split across the vehicle and the aft section of floor drove over the forward section, causing the floor under the front facing wheelchairs to rise.
- All attachments for wheelchairs held and there was no damage to wheelchairs.
- Driver dummy hit windshield and barrier with head during impact.

TABLE 2

DUMMY INJURY CRITERIA VALUES

BUS TEST NO. 4

	MAXIMUM ACCELERATION ("G")*								SEVERITY INDEX	
	HEAD				CHEST				HEAD	CHEST
	X	Y	Z	R	X	Y	Z	R		
DUMMY (1)	-100	38	100	160	-45	9.5	50	75	1020	280
DUMMY (2)	80	90	30**	120	24	24	7.5	32	880	95
DUMMY (3)	-10	-6	30	30	-8	-6	-3.5	9	520	17
DUMMY (4)	-20	6	32	37	-16	9	7.5	19	225	38
DUMMY (5)	-40	-17	-18	47	-17.5	9	-14	22	130	45
DUMMY (6)	-10	-4	20	20.5	- 5.5	-2.3	12.5	13	115	26
DUMMY (7)	48	-70	23	75	16	-28	4	32	243	68

	MAXIMUM FORCE - SEAT BELT LOADS (LBS)	
	RIGHT BELT LOAD	LEFT BELT LOAD
DUMMY (1)	ZERO SHIFT IN DATA	100
DUMMY (3)	720	120
DUMMY (6)	800	1000

	MAXIMUM FORCE - FEMUR LOADS (LBS)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY (4)	230	400
DUMMY (7)	-120	-60

	HEAD INJURY CRITERIA ***			
	HIC	t1 sec	t2 sec	AVE ACCEL (g) t1 to t2
DUMMY (1)	8130	.091	.094	424.6
DUMMY (2)	712	.080	.085	113.8
DUMMY (3)	218	.023	.025	99.9
DUMMY (4)	169	.133	.211	21.6
DUMMY (5)	70	.173	.179	41.4
DUMMY (6)	102	.107	.252	13.8
DUMMY (7)	200	.111	.117	66.2

* DEFINED AS EXCEEDING .003 SEC DURATION
** DATA NOT USEABLE AFTER 200 MILLISECOND
*** AS DEFINED IN FMVSS NO. 208

TABLE 3

BUS TEST WEIGHTS - TEST NO. 4

LEFT FRONT = 3530 LBS
RIGHT FRONT = 3330 LBS
TOTAL FRONT = 6860 LBS

LEFT REAR = 7300 LBS
RIGHT REAR = 7280 LBS
TOTAL REAR = 14580 LBS

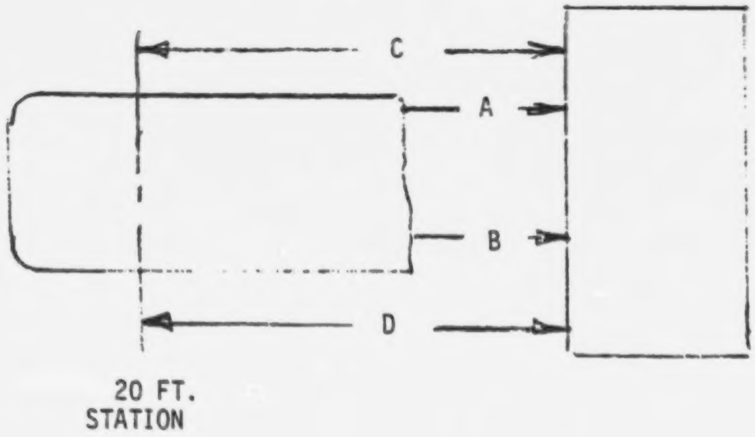
TOTAL WEIGHT = 6860 + 14,580 = 21,440 LBS

WHEEL BASE = 286 INCHES

$$Cg_{FW} = \frac{15{,}580 \text{ LBS} \bullet 286 \text{ INCHES} = 194.5 \text{ INCHES}}{21{,}440 \text{ LBS}}$$

TABLE 4

POST-CRASH DATA SHEET
BUS TEST NO. 4



DIMENSIONS:

A = 25.37 . INCHES
B = 24.25 INCHES
C = 236.4 INCHES
D = 236.4 INCHES

$E = \frac{A + B}{2} =$ 24.8 INCHES (REBOUND)

$F = \frac{C + D}{2} =$ 236.4 INCHES

G = F-E = 211.6 INCHES

CRUSH = 240 - 211.6 = 28.4 INCHES

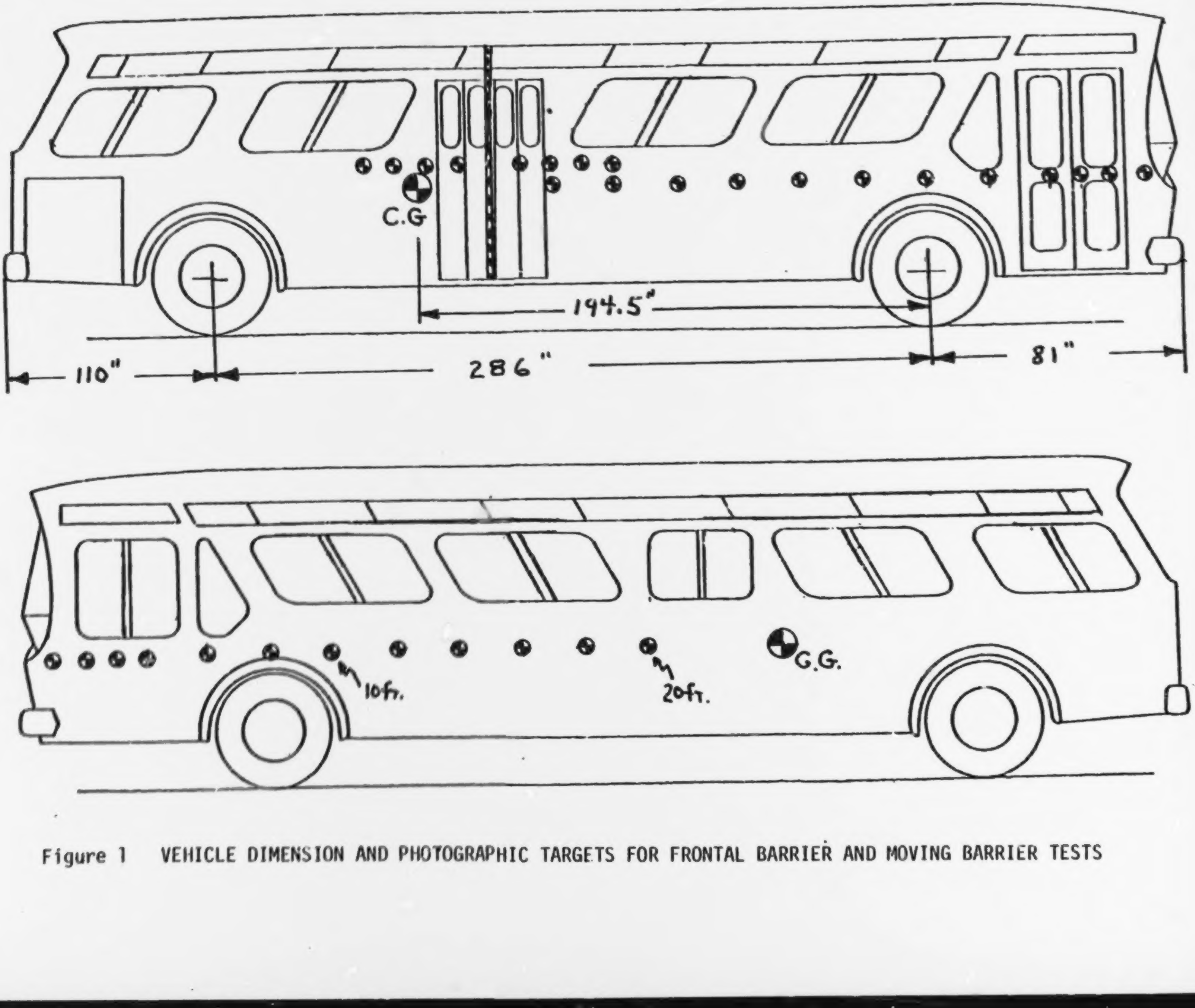

C.G
194.5"
110"
286"
81"
10ft.
20ft.
C.G.

Figure 1 VEHICLE DIMENSION AND PHOTOGRAPHIC TARGETS FOR FRONTAL BARRIER AND MOVING BARRIER TESTS

6440-V-3

BLANK

PAGE

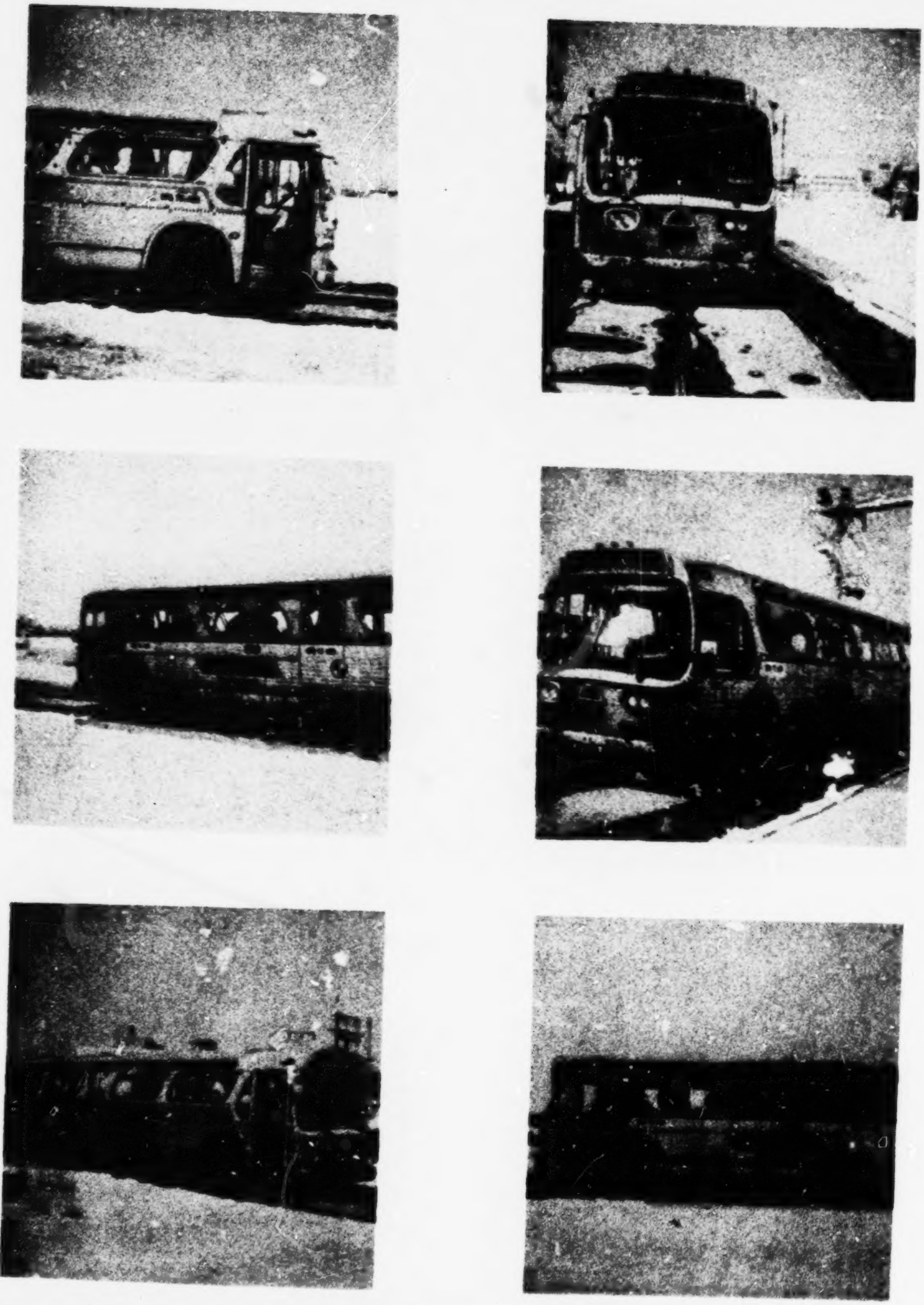


Figure 2 PRE-TEST NO. 4 – TRANSIT BUS (G.M.) EXTERIOR, FRONTAL BARRIER TEST

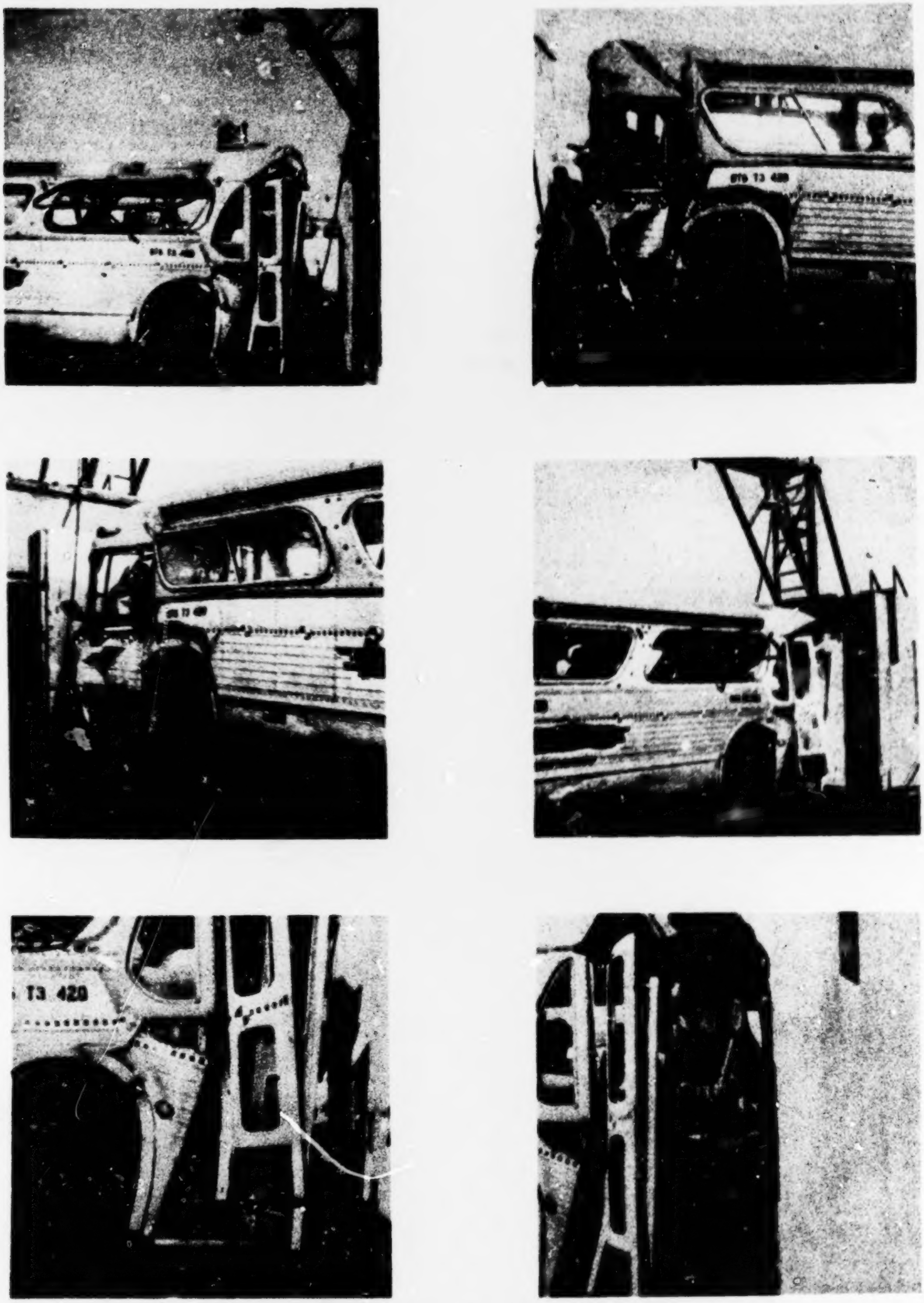


Figure 3 POST-TEST NO. 4 – TRANSIT BUS (G.M.) EXTERIOR, FRONTAL BARRIER TEST

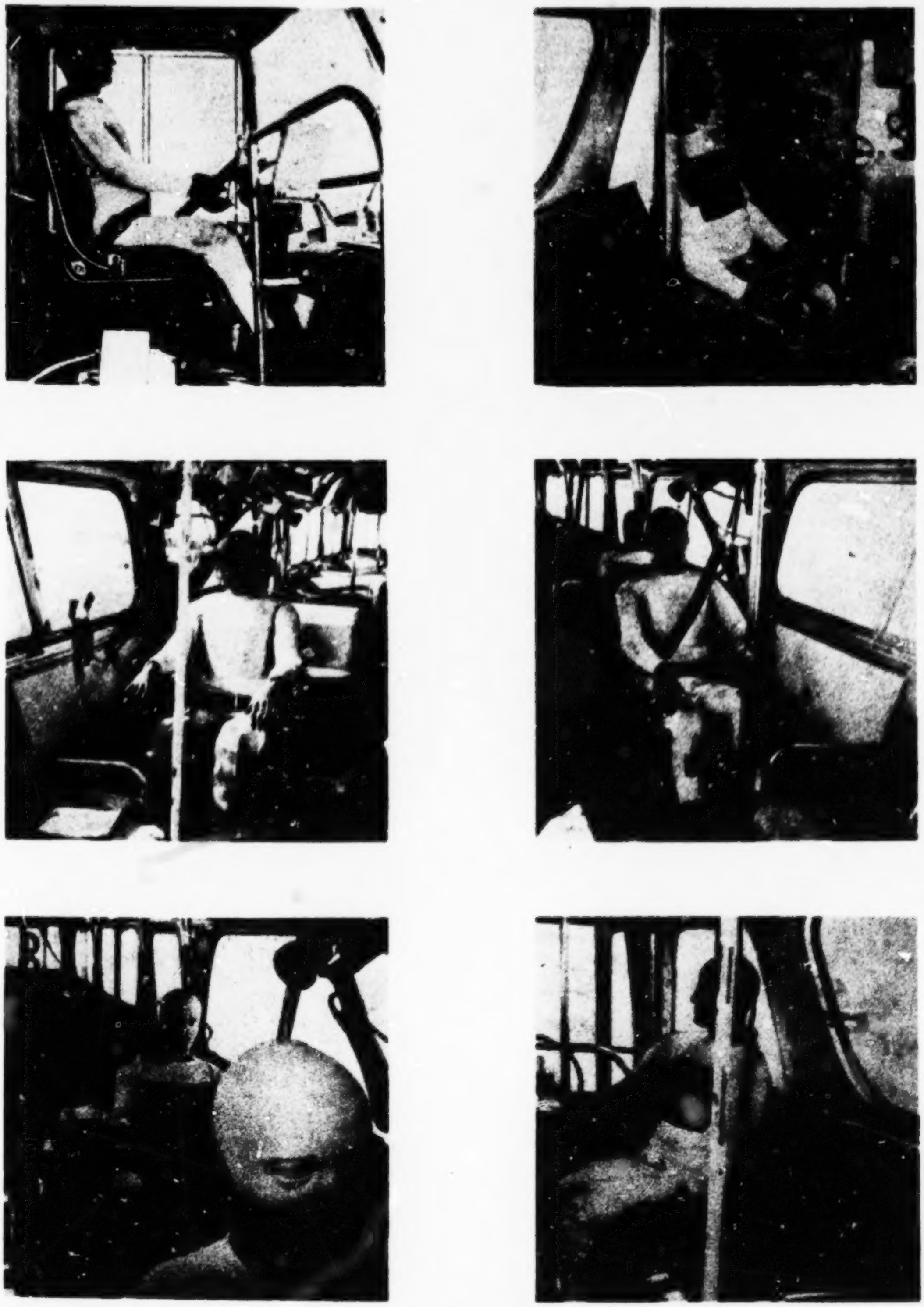


Figure 4 PRE-TEST NO. 4 – TRANSIT BUS (G.M.) INTERIOR, FRONTAL BARRIER TEST

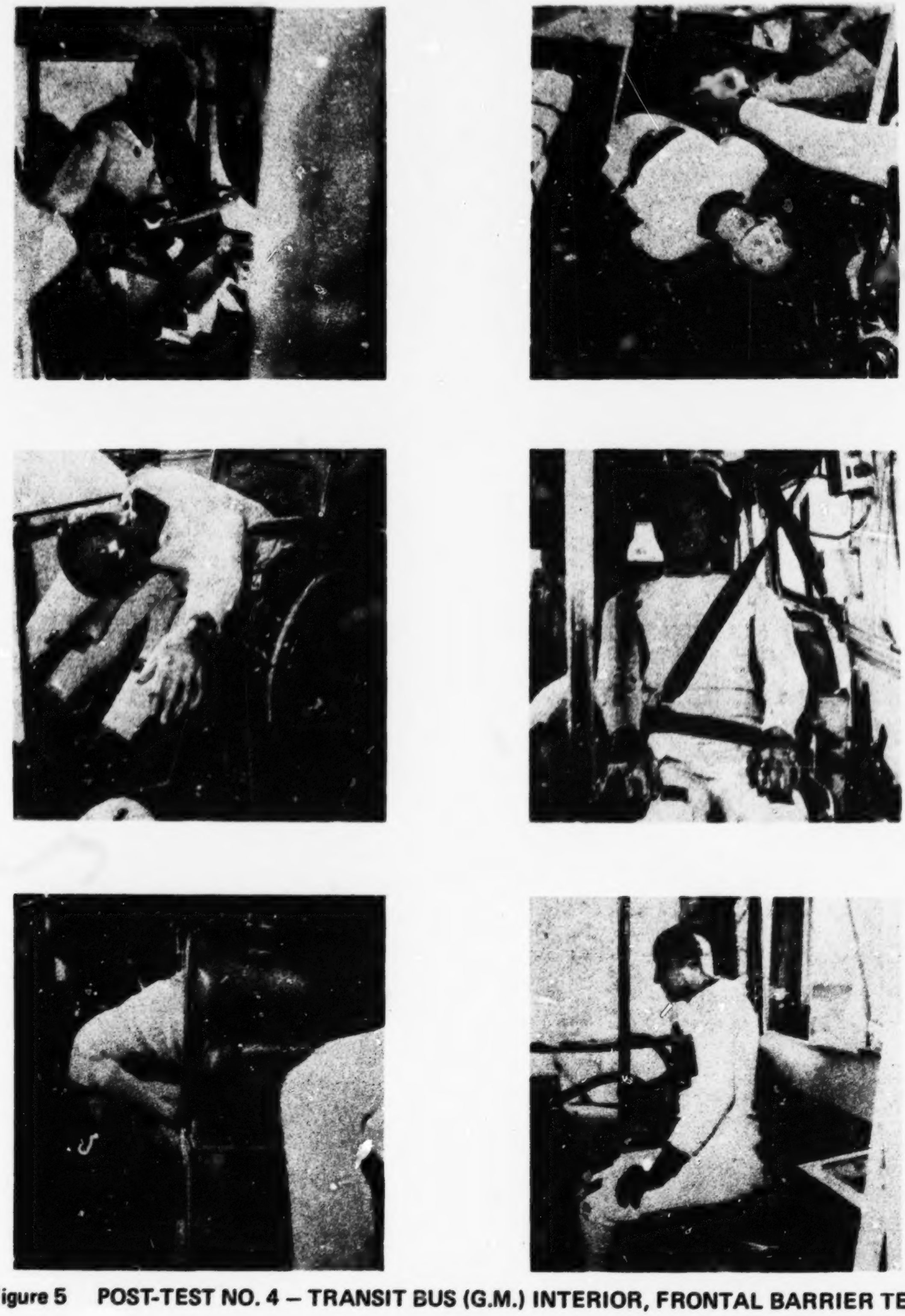


Figure 5 POST-TEST NO. 4 – TRANSIT BUS (G.M.) INTERIOR, FRONTAL BARRIER TEST

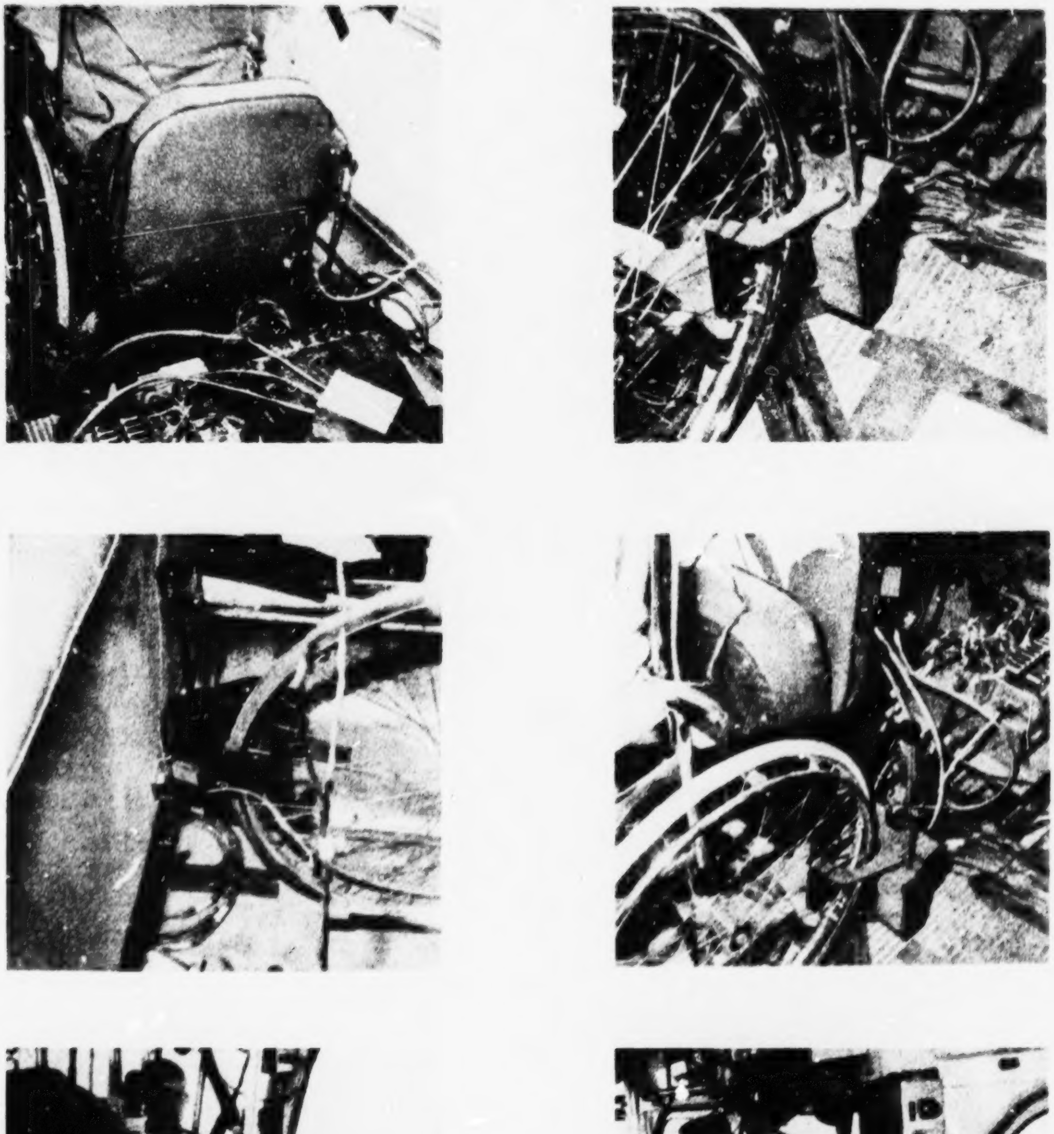
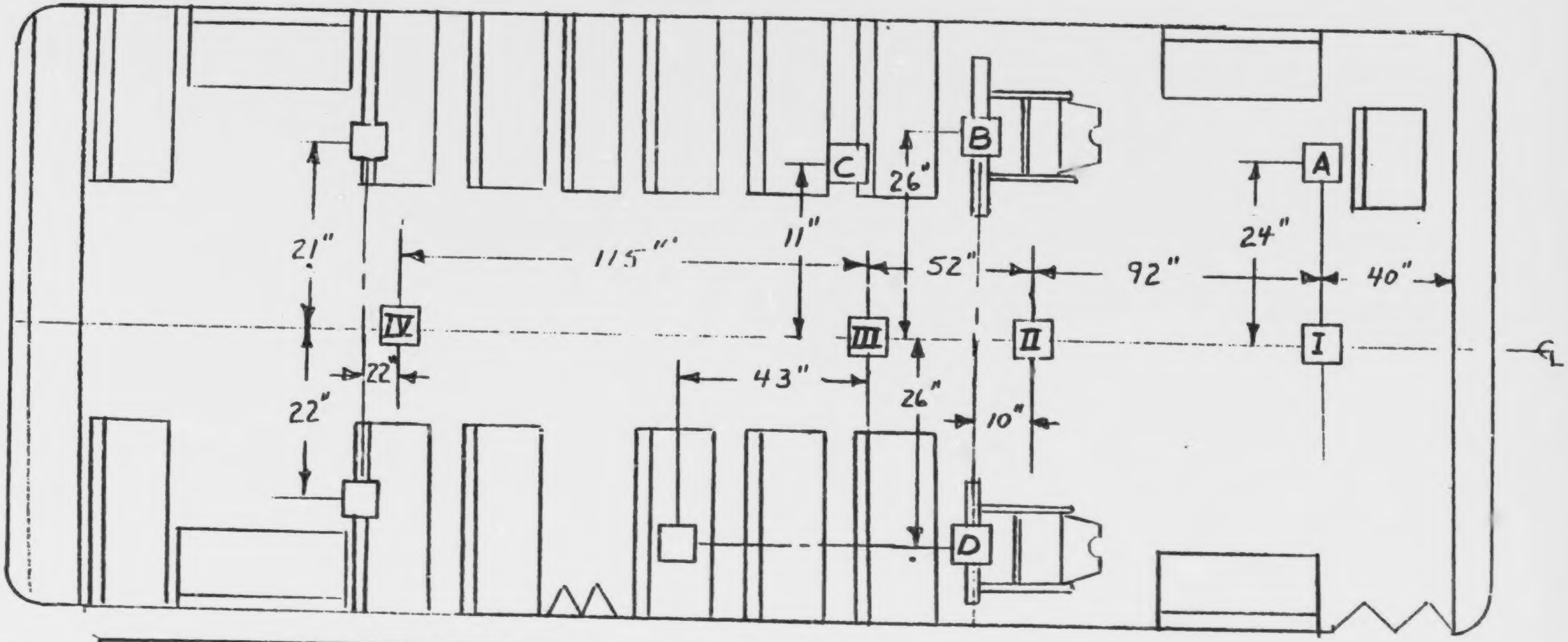
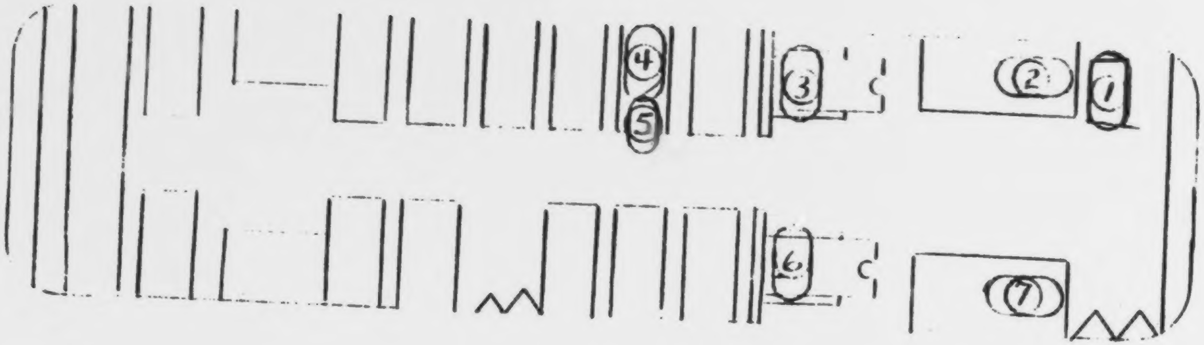


Figure 6 WHEELCHAIR AND BELT ATTACHMENTS EMPLOYED ON TRANSIT BUS (G.M.) TEST


B
C
A
26"
11"
24"
21"
115"
52"
92"
40"
IV
III
II
I
℄
22"
43"
26"
22"
10"
D

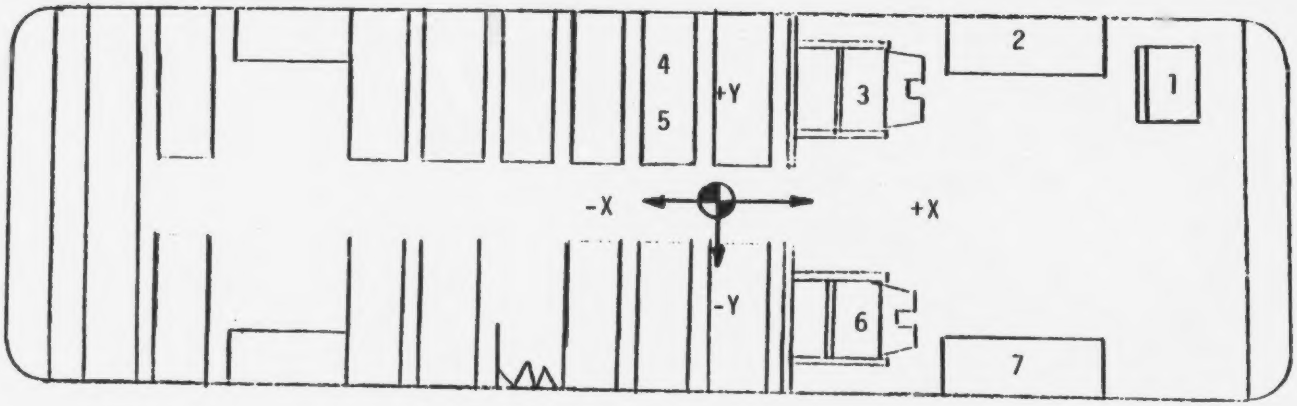
ACCEL. NO.	ACCEL. COMP.
I	X, Y, Z
II	X, Y, Z
III	X, Y, Z
IV	X, Y, Z
A	X Z
B	X Z
C	X Z
D	X Z

Figure 7 ACCELEROMETER LOCATIONS - TEST NO. 4 - FRONTAL BARRIER



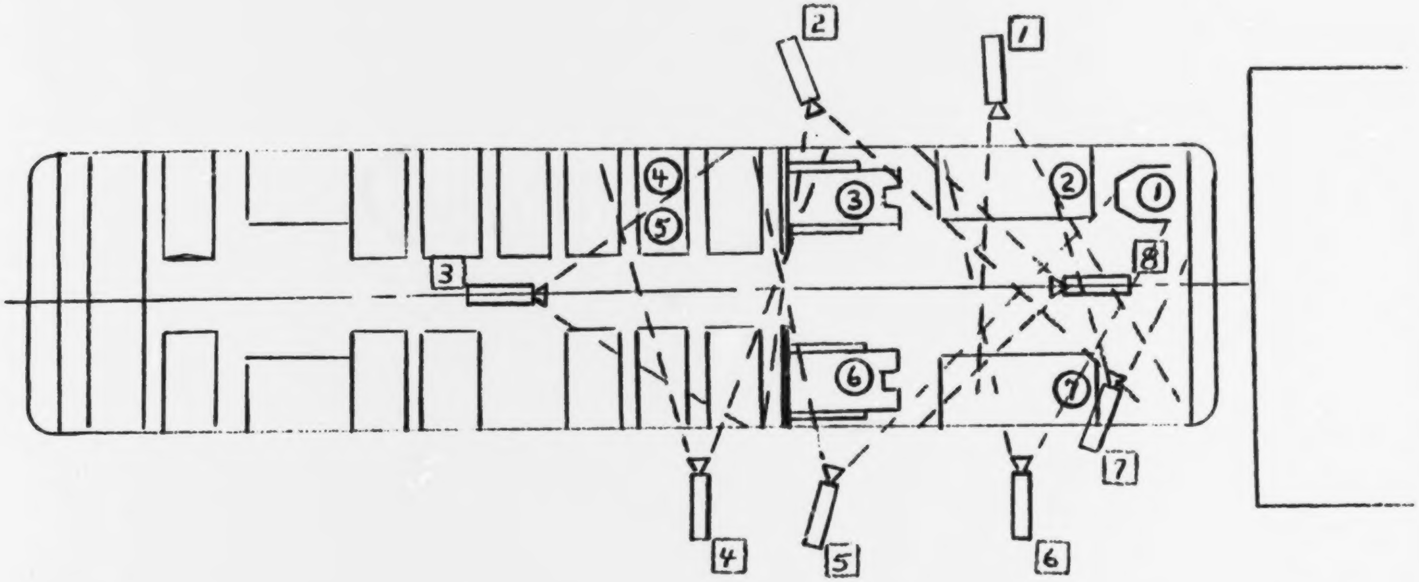
DUMMY POS. & TYPE	TRANSDUCERS			
	HEAD (ACCEL.)	CHEST (ACCEL.)	FEMUR (LOADS)	BELTS (LOADS)
(1) 50%	X, Y, Z	X, Y, Z	--	RIGHT, LEFT
(2) 95%	X, Y, Z	X, Y, Z	--	--
(3) 50%	X, Y, Z	X, Y, Z	--	RIGHT, LEFT
(4) 50%	X, Y, Z	X, Y, Z	RIGHT, LEFT	--
(5) 6-YR OLD	X, Y, Z	X, Y, Z	--	--
(6) 50%	X, Y, Z	X, Y, Z	--	RIGHT, LEFT
(7) 50%	X, Y, Z	X, Y, Z	RIGHT, LEFT	

Figure 8 DUMMY SEATING POSITION AND INSTRUMENTATION FOR FRONTAL BARRIER TEST NO. 4



DUMMY LOCATION		HEAD TARGET			HIP TARGET			KNEE TARGET		
		X	Y	Z	X	Y	Z	X	Y	Z
POS. 1	PRE	233	+23-1/2	50	235	+18	25-1/2	255-1/2	+17	23-1/2
	POST	232	+24-1/2	52	236	+19-1/2	26	249	+16	26
POS. 2	PRE	207-1/2	+33-1/2	49	204	+32-1/2	22-3/4	203	+15	21-1/2
	POST	168	-9	3-1/2	200	+ 6	4	213	-9	1/4
POS. 3	PRE	134	+17	49	135-1/2	+17-1/2	22	152-1/2	+16-3/4	23-1/2
	POST	137	+16-1/2	49	135	+17-1/4	22	153-1/2	17-1/2	22-1/2
POS. 4	PRE	65	+34-1/2	45	65	+28	20	86	+29	20
	POST	65	-3	5-3/4	72	+13	+24	76	+22	9-1/2
POS. 5	PRE	63	+18	37	70	+17	18	82-1/2	+16	19
	POST	76	-8	6	81	-9	7	87-1/2	+17	1/4
POS. 6	PRE	132-1/2	-19-1/2	49	133	-16-3/4	20	151	-18	22
	POST	161	-21	26	137	-16-1/2	21	152	-18	20
POS. 7	PRE	208	-39-1/2	47	230	-35-1/2	22	230	-18	21-1/2
	POST	224	27	47	225	-30	23	225	-16	19

Figure 9 PRE- AND POST-TEST NO. 4 - DUMMY LOCATIONS

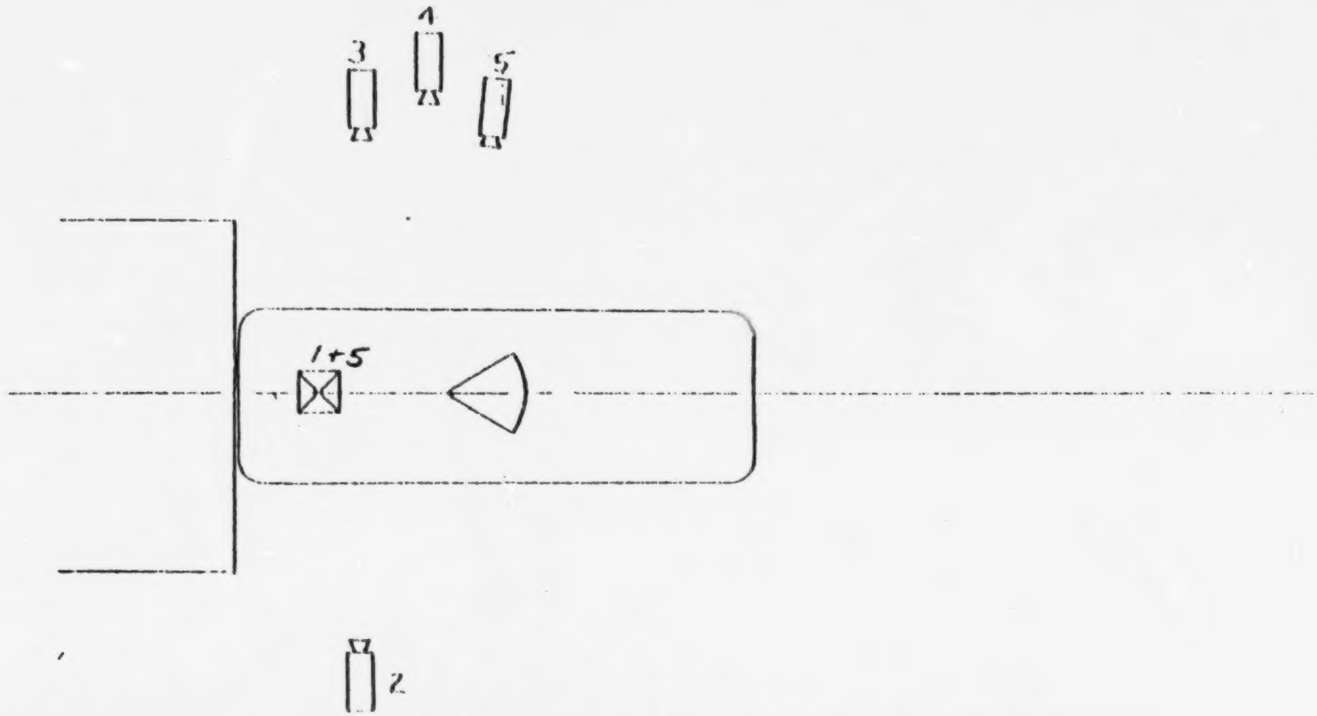


LOCATION NO.	TYPE	LENS (mm)	SPEED (fps)
1	STALEX	8	1000
2	STALEX	8	*
3	PHOTOSONIC	8	350
4	PHOTOSONIC	8	250
5	STALEX	8	750
6	STALEX	8	1100
7	STALEX	8	1050
8	STALEX	8	0

*LOST TIMING LIGHT

Figure 10 ON-BOARD CAMERA COVERAGE FOR TEST NO. 4

164



LOC. NO.	LOCATION	CAMERA TYPE	LENS (mm)	SPEED (fps)
1	TOWER	PHOTOSONIC	13	700
2	NORTH CLOSE	PHOTOSONIC	13	750
3	SOUTH CLOSE	PHOTOSONIC	13	700
4	SOUTH WIDE	PHOTOSONIC	13	400
5	PIT	PANING CAMERA	--	24

Figure 11 OFF-BOARD CAMERA COVERAGE FOR TEST NO. 4

BLANK

PAGE

TABLE 5

CRASH TEST SUMMARY

TEST NO. 5 **PROJECT** MINICARS BUS TESTS

DATE 3/2/79 **TIME** 14:10 **TEMP.** 38°F

TEST CONDITION MOVING BARRIER TEST (30 mph)

VEHICLE NO. 1 G.M. TRANSIT BUS

VEHICLE NO. 2 SAE MOVABLE BARRIER

	VEH. NO. 1	VEH. NO. 2
TEST WEIGHT (lbs)	21,440	4020
IMPACT ANGLE (deg)*	0	90
IMPACT VELOCITY (mph)**	0	30.70
MAX. CRUSH (in)	12	--

DUMMIES VEH. NO. 1

TYPE
1 - 95% ADULT DUMMY
5 - PART 572 - HYBRID II
1 - 6 YR. OLD CHILD DUMMY

LOCATION SEE FIGURE 20

RESTRAINT SEE FIGURE 20

NUMBER OF DATA CHANNELS 65

NUMBER OF HIGH SPEED CAMERAS 12 PLUS ONE PANING CAMERA

---

*WITH RESPECT TO TOW TRACK CENTERLINE

**SPEED TRAP MEASUREMENT (±0.5% ACCURACY)

GENERAL COMMENTS - TEST NO. 5

- The centerline of the moving barrier made contact on the centerline of the rear access door.
- The impact drove door well under floor of bus raising floor of bus aft of the access door.
- Scratch tubs on each side of access door as shown in Figure 16 recorded 5.5 inches on forward side of door opening and 5.25 inches on aft side of door opening. The aft scratch tube bent when floor buckled. Both scratch tubes returned one inch from maximum reading.
- The struck access door was not damaged during impact and was workable after impact.
- All cameras functioned properly except for the loss of the timing light on one camera (see Figure 22).
- All on-board lighting functioned properly.
- There was no damage to the wheelchairs but the wheelchair attachment, as shown in Figure 18, was opened after the impact and allowed the wheelchair to move during impact. The attachment mechanism worked well after the impact. Therefore the question of a defective or improperly latched unit arises.
- There was a triaxial accelerometer package mounted on the moving barrier and the data are presented at the end of Appendix II.
- The moving barrier was damaged again in this test and will have to be repaired.

TABLE 6

DUMMY INJURY CRITERIA VALUES
MOVING BARRIER TEST NO. 5

	MAXIMUM ACCELERATION ("G")*								SEVERITY INDEX	
	HEAD				CHEST					
	X	Y	Z	R	X	Y	Z	R	HEAD	CHEST
Dummy (2)	-4	-4	**	6	-1.5	-3.7	-3.2	4.8	4	2.4
Dummy (3)	-2	2	-4	4	-2.8	.6	-4.5	4.5	4	1.6
Dummy (4)	6	1	6	7.5	5	.7	2	5	10.3	2.4
Dummy (5)	5	-4.5	-6.2	7.0	8	-9	-4.5	11.2	5.6	9.5
Dummy (6)	12	-40	25	45	30	-60	-6	70	320	410
Dummy (7)	-3	-6	6	8	3.5	-10	-3.7	10.5	13	7.2

	MAXIMUM FORCE - SEAT BELT LOADS (LBS)	
	RIGHT BELT LOAD	LEFT BELT LOAD
Dummy (2)	980	Data Lost (Cut Wire)
Dummy (7)	800	320

	MAXIMUM FORCE - FEMUR LOAD (LBS)	
	RIGHT FEMUR	LEFT FEMUR
Dummy (4)	40	100
Dummy (5)	40	40

	HEAD INJURY CRITERIA***			
	HIC	t_1 sec	t_2 sec	AVE. ACCEL. (G) t_1 to t_2
Dummy (2)**	5.1	.214	.215	31.27
Dummy (3)	3.1	.057	.299	2.7
Dummy (4)	7.9	.031	.163	5.1
Dummy (5)	3.7	.018	.108	4.4
Dummy (6)	155.2	.023	.093	21.7
Dummy (7)	9.8	.044	.298	4.3

* Defined as exceeding .003 sec. duration.

** Head Z-acceleration data lost. Resultant, HIC, etc. calculated using X and Y only.

*** As defined in FMVSS No. 208.

TABLE 7

BUS AND BARRIER TEST WEIGHTS - TEST NO. 5

- G.M. TRANSIT BUS - SAME AS TEST NO. 4 - SEE TABLE 2.
- MOVING BARRIER TEST WEIGHT

LEFT FRONT = 940 LBS	LEFT REAR = 1050 LBS
RIGHT FRONT = 1410 LBS	RIGHT REAR = 620 LBS
TOTAL FRONT = 2350 LBS	TOTAL REAR = 1670 LBS

TOTAL WEIGHT = 2350 + 1670 = 4020 LBS

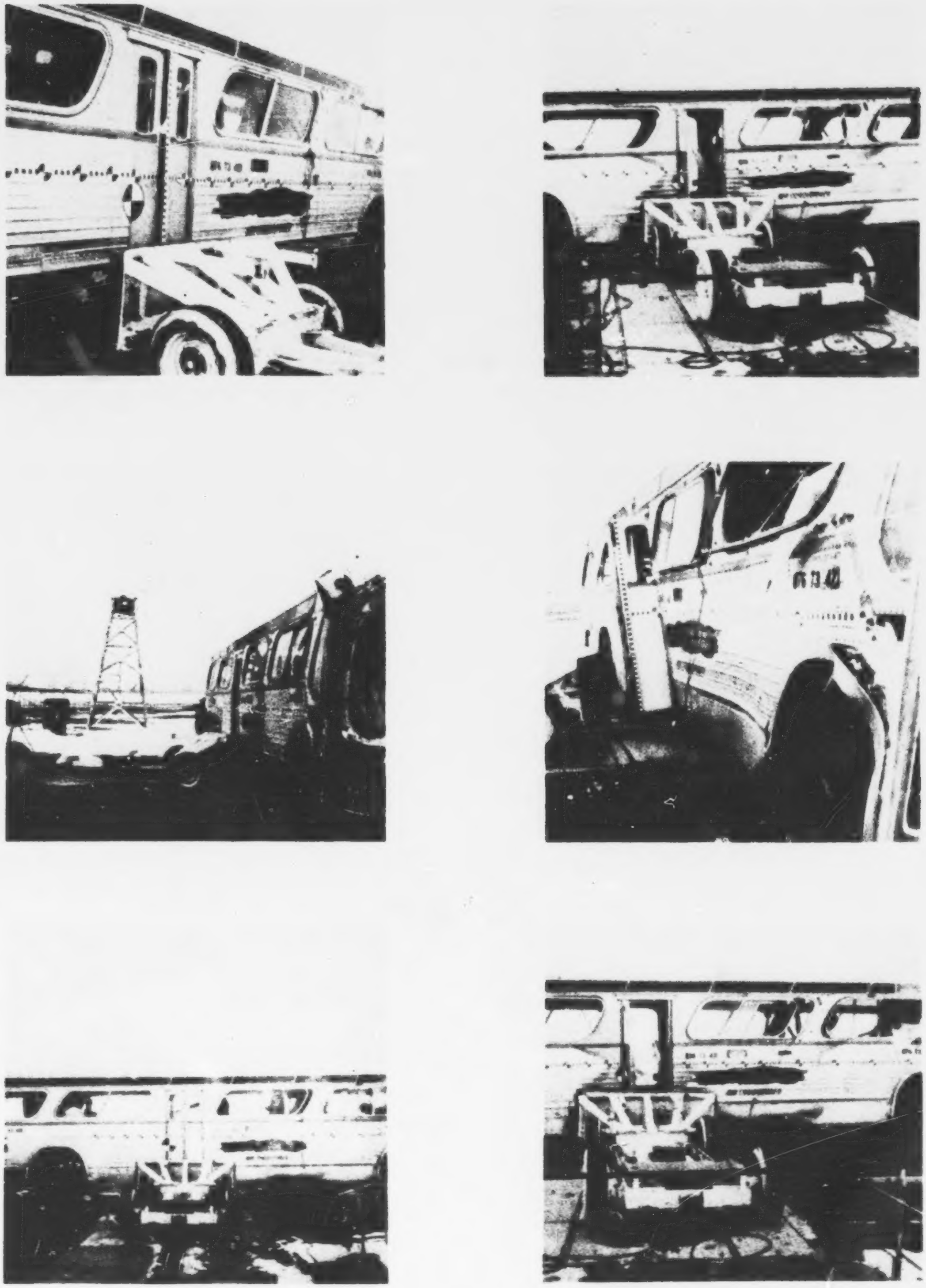


Figure 12 PRE- AND POST-TEST NO. 5 – TRANSIT BUS (G.M.) EXTERIOR, MOVING BARRIER TEST

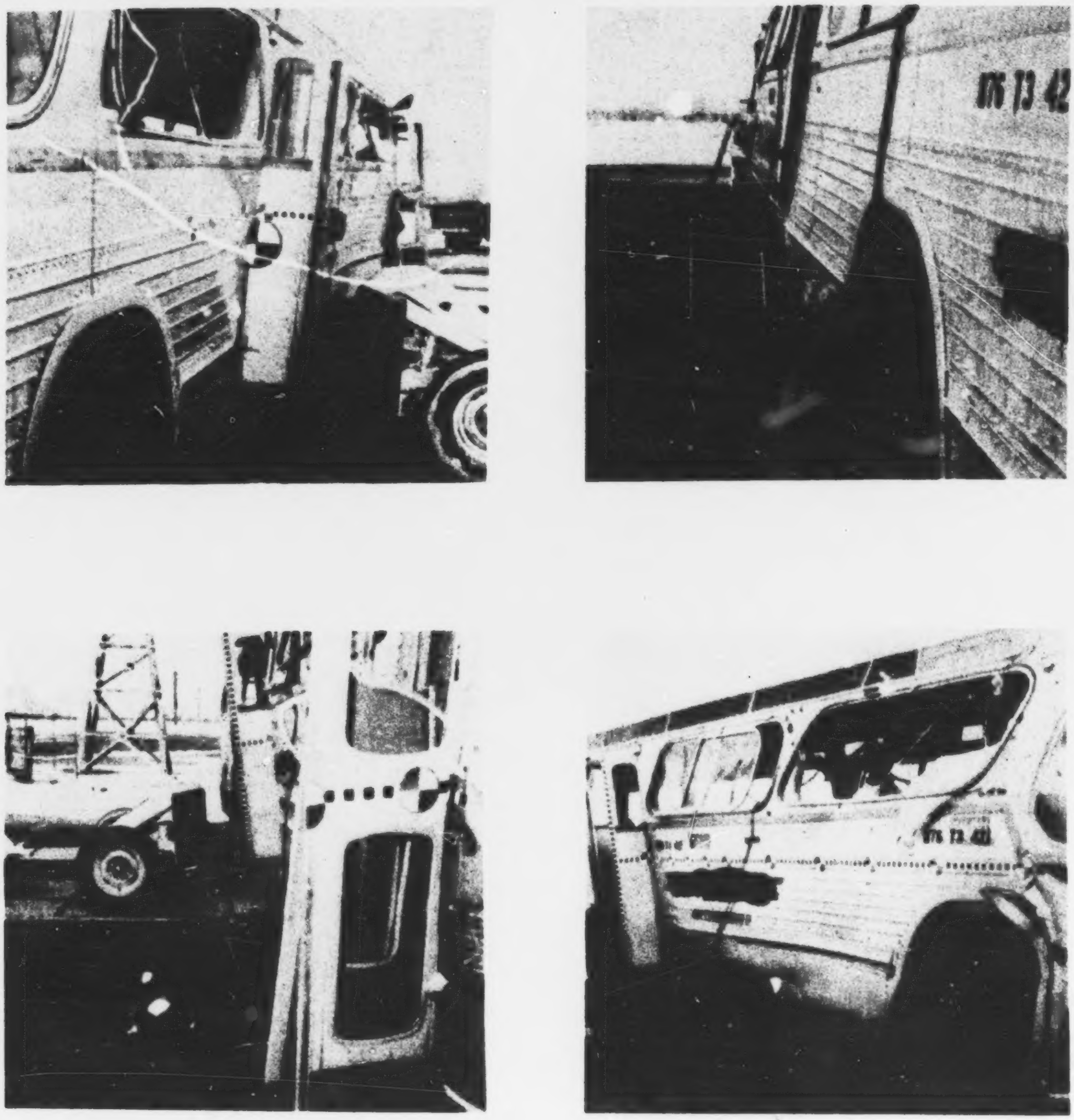


Figure 13 POST-TEST NO. 5 – TRANSIT BUS (G.M.) EXTERIOR, MOVING BARRIER TEST

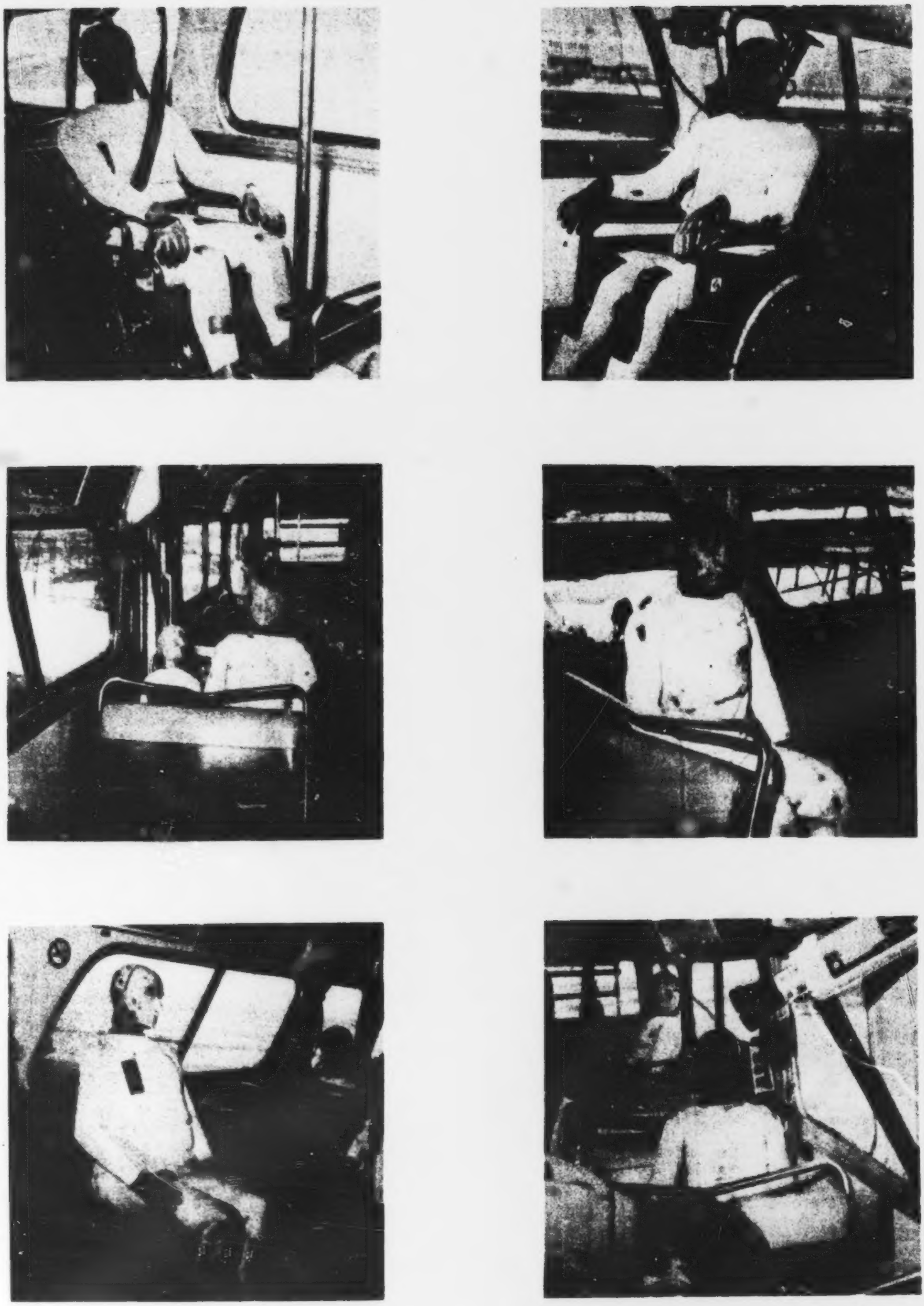


Figure 14 PRE-TEST NO. 5 – TRANSIT BUS (G.M.) INTERIOR, MOVING BARRIER TEST

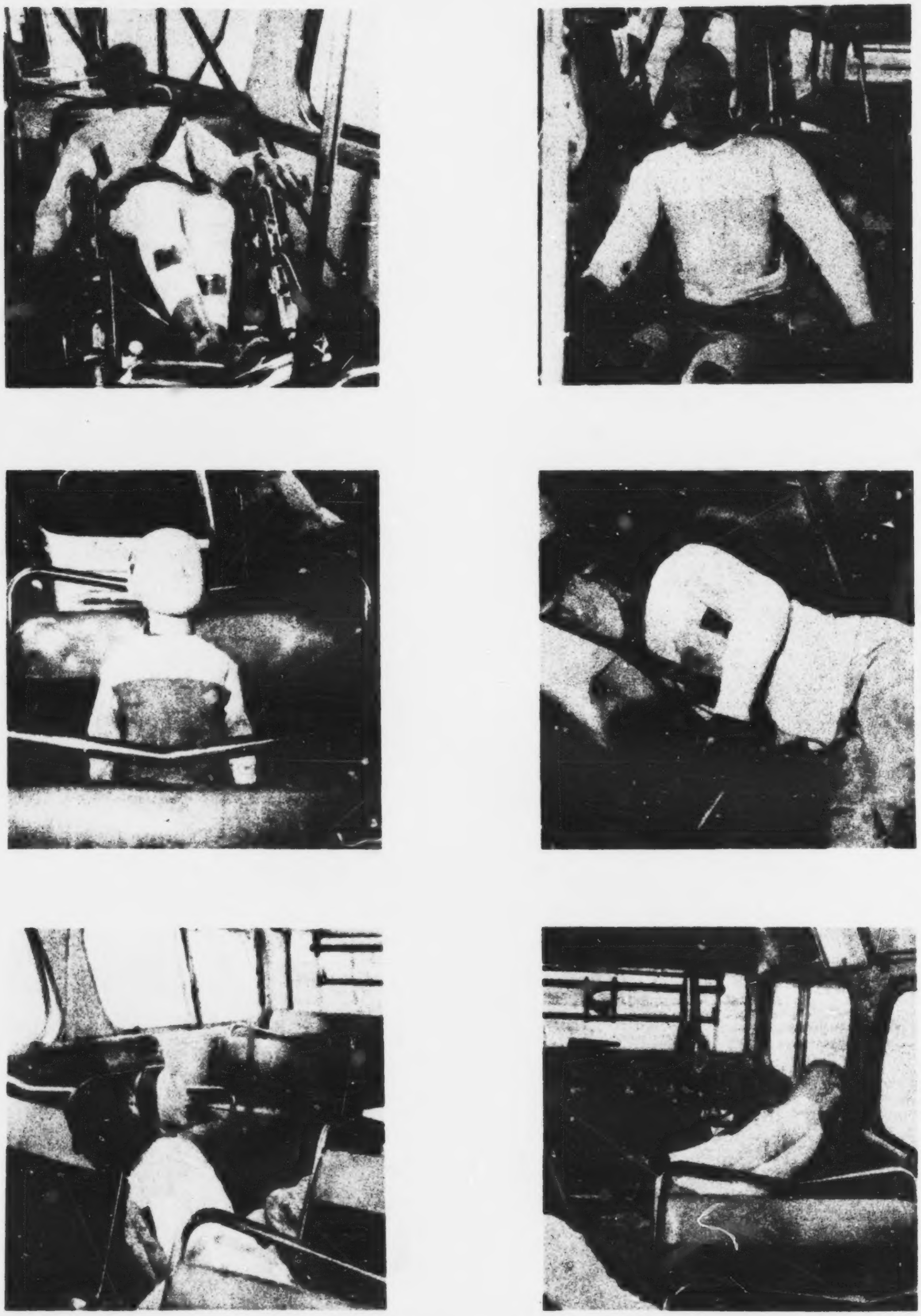
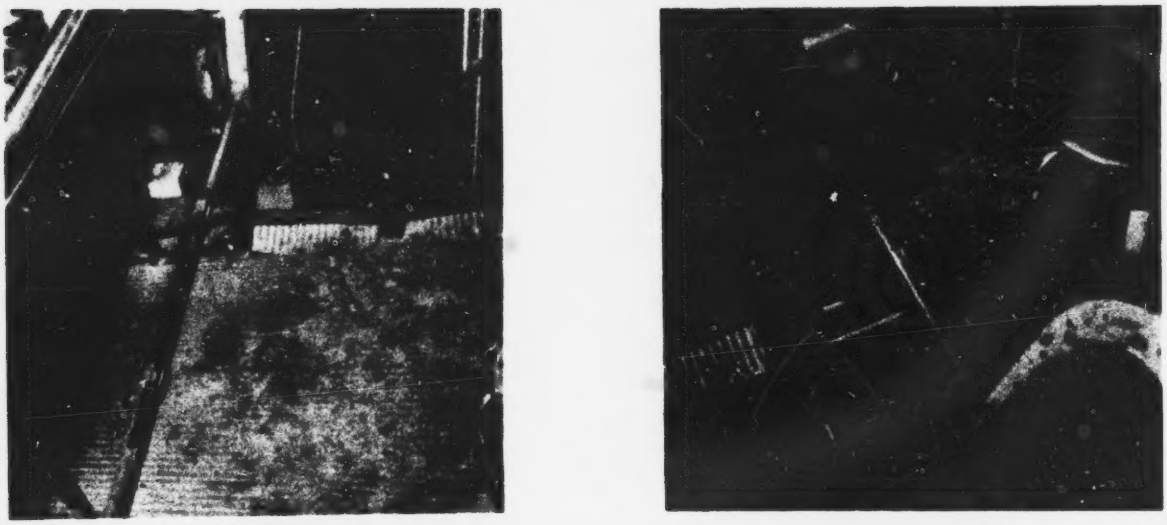


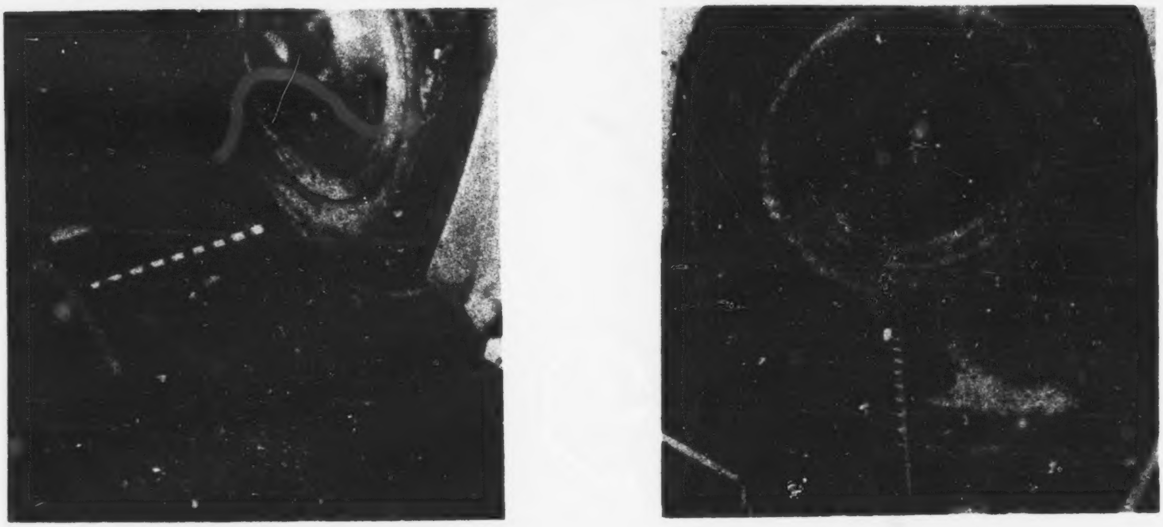
Figure 15 POST-TEST NO. 5 – TRANSIT BUS (G.M.) INTERIOR, MOVING BARRIER TEST



FWD SCRATCH TUBE

AFT SCRATCH TUBE

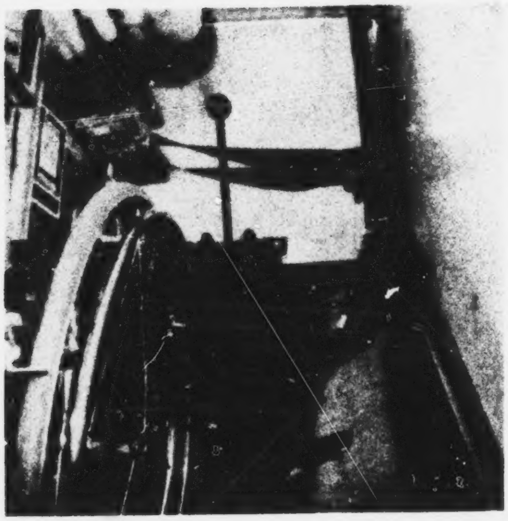
Figure 16 SIDE INTRUSION MEASUREMENTS



FRONT WHEEL SLID
18 INCHES AS SHOWN

REAR WHEEL SLID
12 INCHES AS SHOWN

Figure 17 VEHICLE MOTION



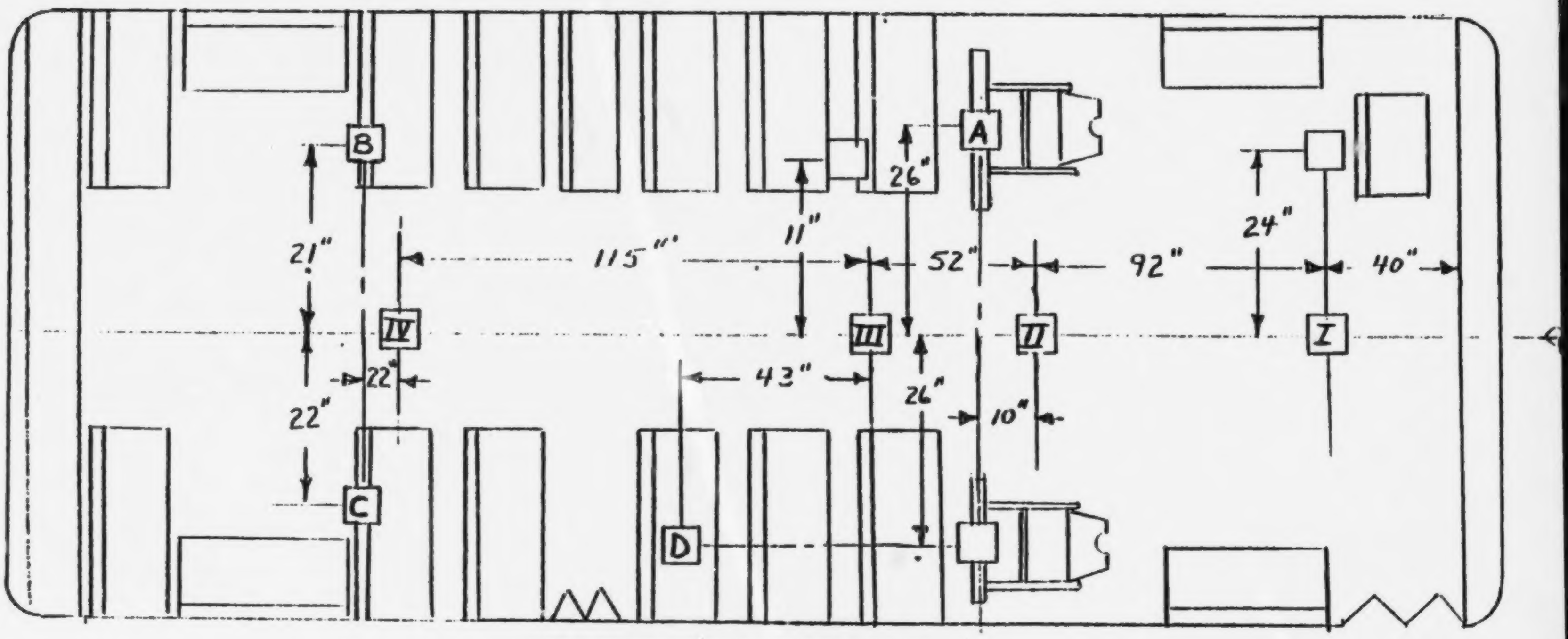
WHEELCHAIR ATTACHMENT OPENED ON IMPACT AND ALLOWED LEFT WHEEL TO MOVE FORWARD

Figure 18 WHEELCHAIR ATTACHMENT

TABLE 8

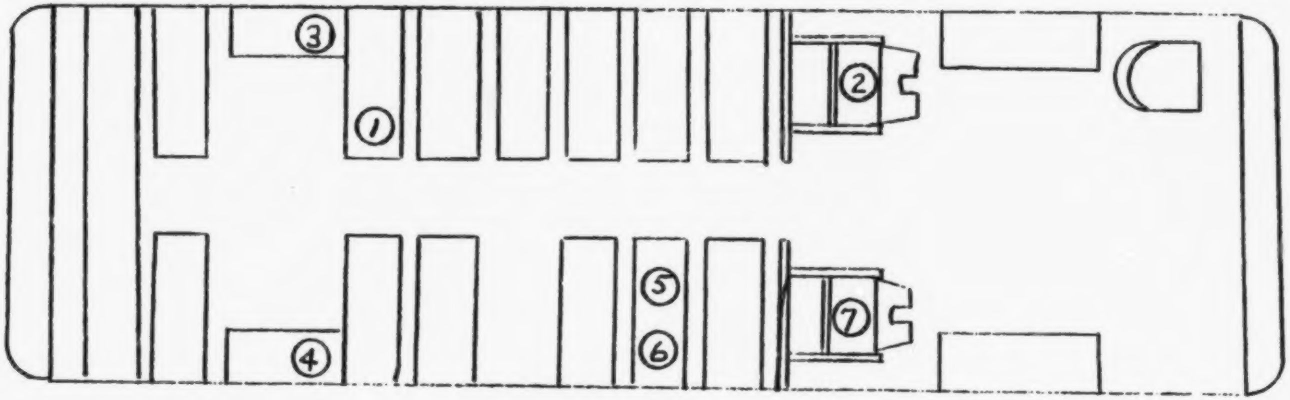
EXTERNAL SIDE INTRUSION MEASUREMENTS - TEST NO. 5

DISTANCE FROM FRONT SURFACE OF VEHICLE	DISTANCE UP FROM GROUND PLANE			
	16 INCHES	35 INCHES	53 INCHES	68 INCHES
INCHES	INCHES	INCHES	INCHES	INCHES
72	0	0	0	0
96	2.2	2.3	0	0.7
120	0.2	1.7	1.6	1.7
144	4.0	4.6	4.4	4.6
168	6.8	5.2	4.7	4.0
192	6.5	4.8	4.6	4.5
204	6.7	4.7	4.6	4.5
216	7.4	4.7	4.6	4.3
228	9.5	6.5	4.7	4.4
240	12.0	9.0	6.2	4.7
252	10.8	9.5	7.3	5.7
Center of → 264 Impact	10.8	9.5	7.3	5.7
276	10.5	8.7	7.3	5.7
288	9.5	7.8	6.8	4.8
300	7.6	4.7	5.2	4.7
312	4.5	2.8	3.5	3.7
324	3.5	2.0	1.5	2.6
336	4.0	1.8	1.2	1.5
360	0	0	0.5	0.6
372	0	0	0	0


B
A
C
D
I
II
III
IV
21"
22"
22"
115"
52"
92"
40"
11"
26"
26"
24"
43"
10"

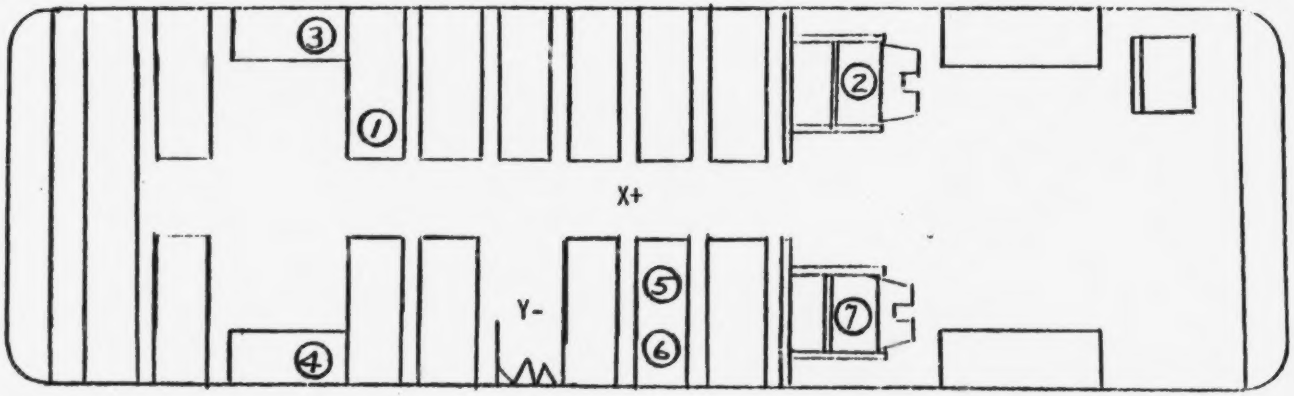
ACCEL. NO.	ACCEL. COMP.
I	X Y Z
II	X Y Z
III	X Y Z
IV	X Y Z
A	X Y
B	X Y
C	X Y
D	X Y

Figure 19 ACCELEROMETER LOCATIONS - TEST NO. 5 - MOVING BARRIER



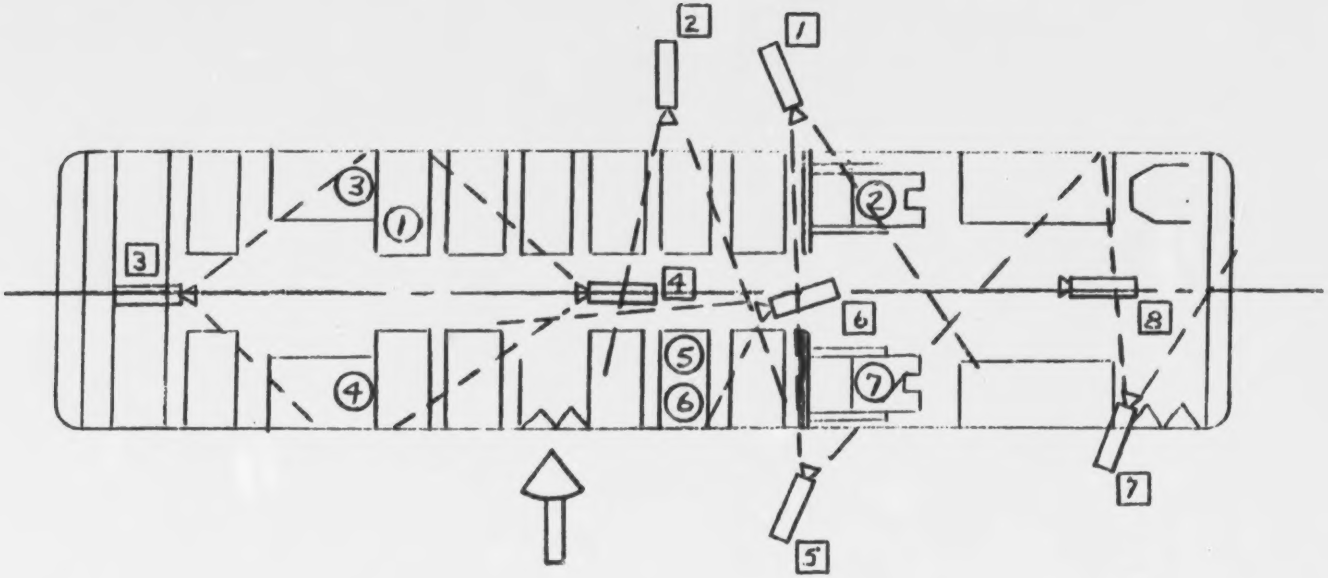
DUMMY POS. & TYPE		TRANSDUCERS			
		HEAD (ACCEL.)	CHEST (ACCEL.)	FEMUR (LOADS)	BELT (LOADS)
1	50%	--	--	--	--
2	50%	X Y Z	X Y Z	--	--
3	95%	X Y Z	X Y Z	--	--
4	50%	X Y Z	X Y Z	RIGHT, LEFT	--
5	50%	X Y Z	X Y Z	RIGHT, LEFT	--
6	6-YR. OLD	X Y Z	X Y Z	--	--
7	50%	X Y Z	X Y Z	--	RIGHT, LEFT

Figure 20 DUMMY SEATING POSITIONS AND INSTRUMENTATION FOR MOVING BARRIER - TEST NO. 5



DUMMY POSITION		HEAD TARGET			HIP TARGET			KNEE TARGET		
		X	Y	Z	X	Y	Z	X	Y	Z
POS. 1 50%	PRE	-9	+32	45	-3	+25	19	+17	+25-1/2	18-1/2
	POST	-58	-11-1/2	36	-59-1/2	+6	11	-43	-2	11
POS. 2 50%	PRE	+128	+19	49	130	+18	21	147	+20-1/2	23
	POST	+119	+20-1/2	41-1/2	136	+12	17	146	+10	31
POS. 3 95%	PRE	-81	+36	49	-77	+34-1/2	22	-76	+16	21-1/2
	POST	-88	+38	40	-83	+25	21-1/2	-78-1/2	+3	21-1/2
POS. 4 50%	PRE	-80	-36	48	-75	-33-1/2	23	-76-1/2	-19-1/2	21
	POST	-82	-16	32	-72-1/2	-10	8-1/2	84-1/4	+8	16
POS. 5 50%	PRE	+32-1/2	-16-3/4	45	+35-1/2	-14	19	+53	-16-1/2	20-1/2
	POST	+55	+35	13-1/2	+58	+6	14	+43-1/2	-5	9-1/2
POS. 6 6-YR. OLD	PRE	+31	-32-1/2	37	+35	-31-1/2	19-1/2	+48	-32-1/2	18-1/2
	POST	+32	-26	33	+40	-21-1/2	19	+54	-22-1/2	18
POS. 7 50%	PRE	131	-20	49	133	-18	22	148-1/2	-17	23
	POST	140	-26	49	137	-16-1/2	21-1/2	154	-22-1/4	22

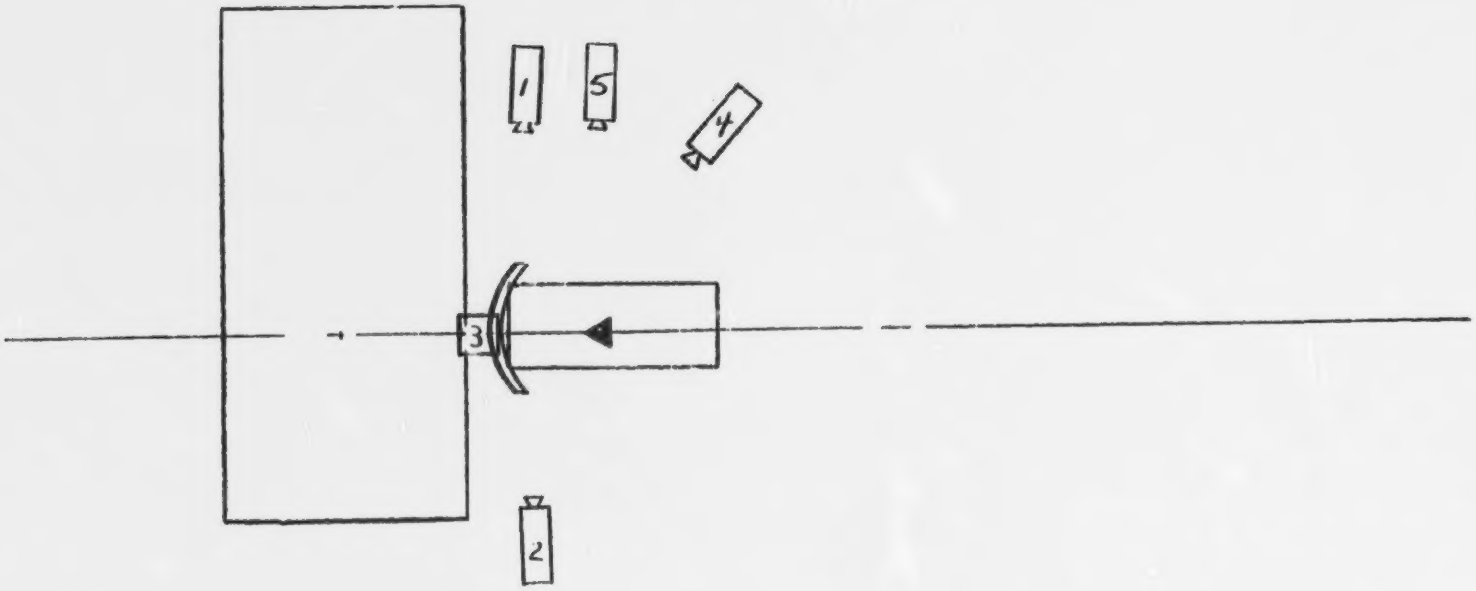
Figure 21 PRE- AND POST-TEST NO. 5 - DUMMY LOCATIONS



LOCATION NO.	TYPE	LENS (mm)	SPEED (fps)
1	STALEX	8	*
2	PHOTOSONIC	8	400
3	PHOTOSONIC	8	500
4	STALEX	8	800
5	STALEX	8	650
6	STALEX	8	700
7	STALEX	8	650
8	STALEX	8	750

*NO TIMING

Figure 22 ON-BOARD CAMERA COVERAGE FOR TEST NO. 5



LOC. NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)
1	SOUTH	PHOTOSONIC	13	600
2	NORTH	PHOTOSONIC	13	600
3	TOWER	PHOTOSONIC	13	325
4	TOWER 45°	PHOTOSONIC	13	625
5	PAN	PANING	--	24

Figure 23 OFF-BOARD CAMERA COVERAGE FOR TEST NO. 5

6440-V-3

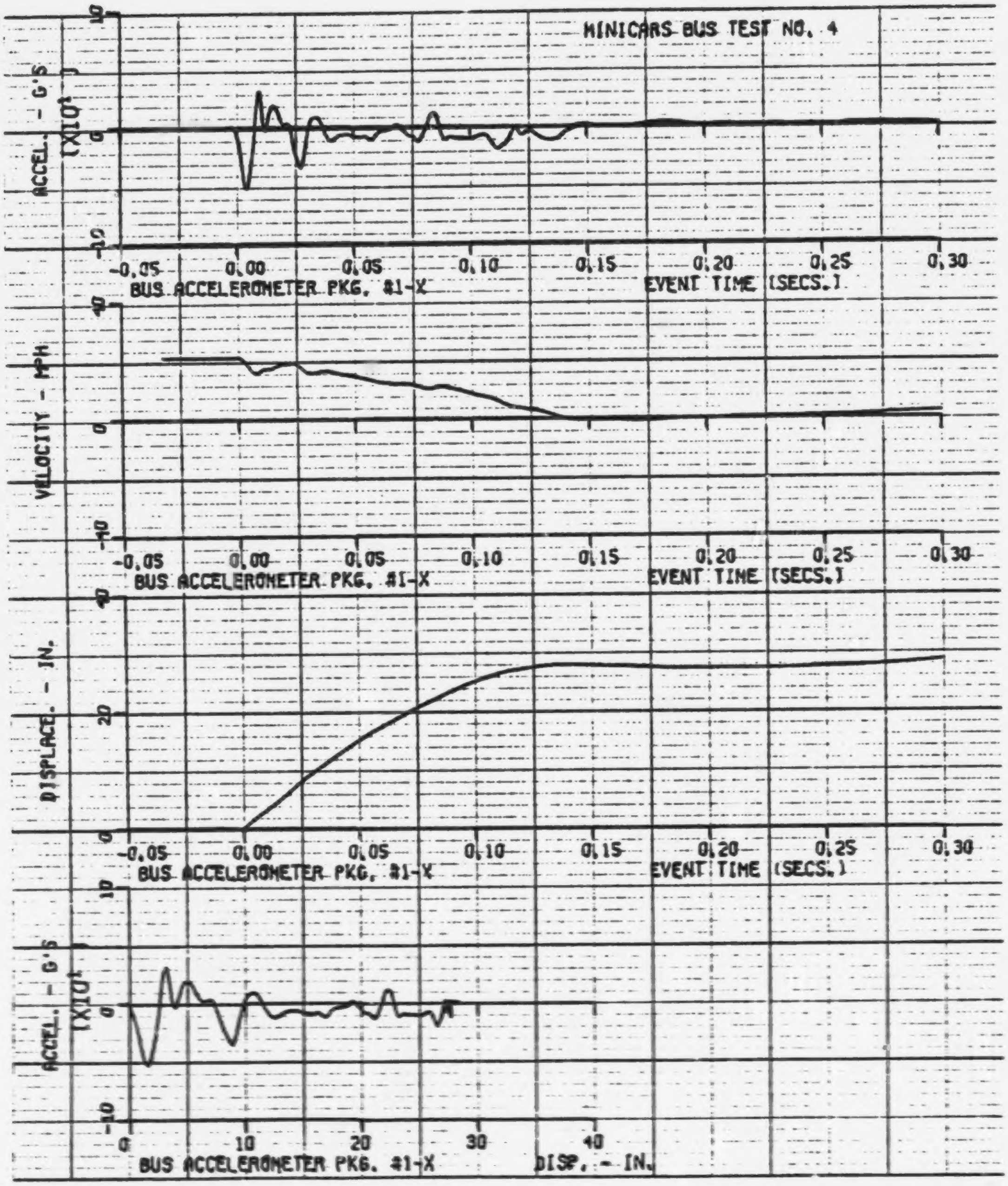
BLANK

PAGE

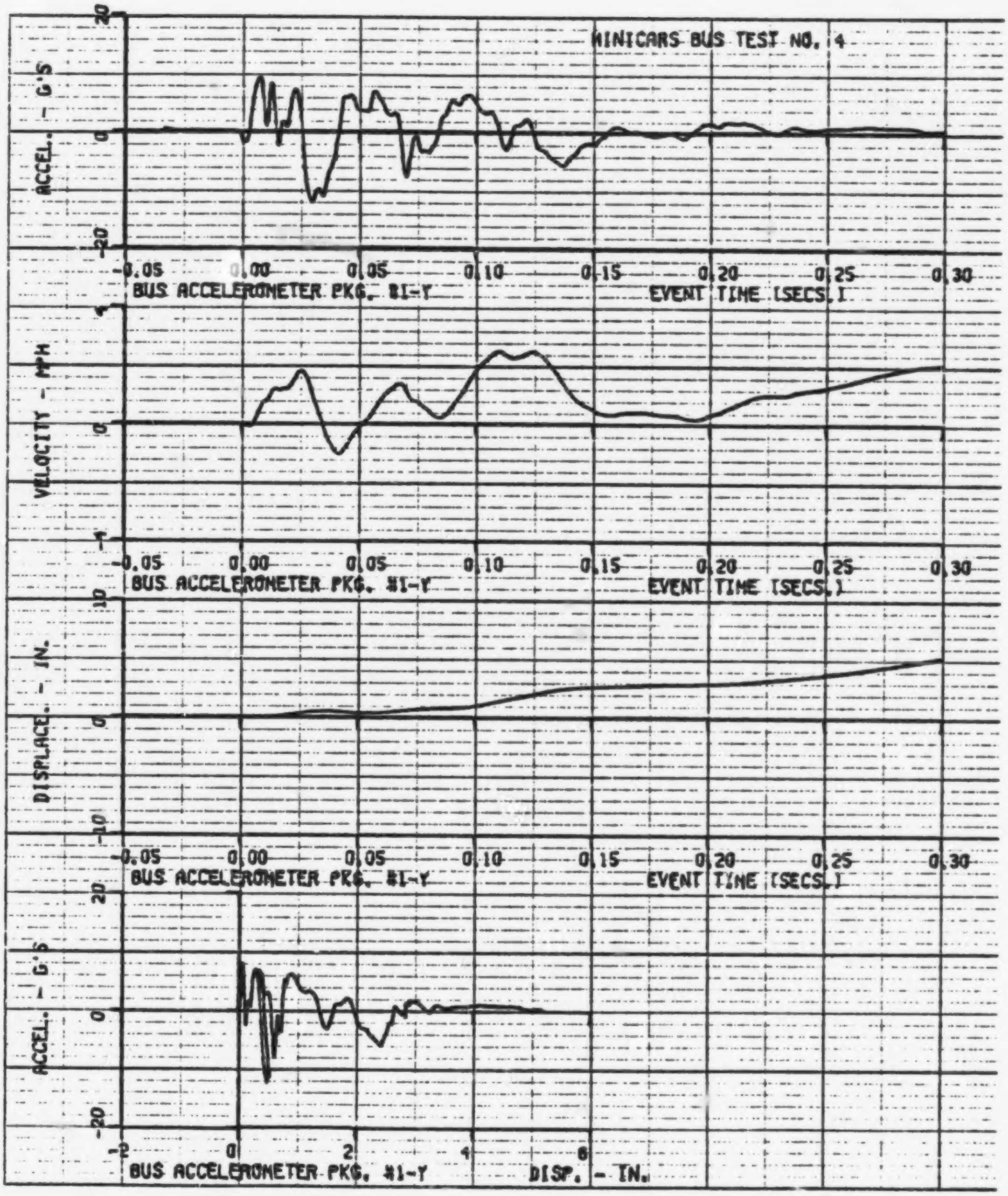
APPENDIX 1

TEST NO. 4 DATA

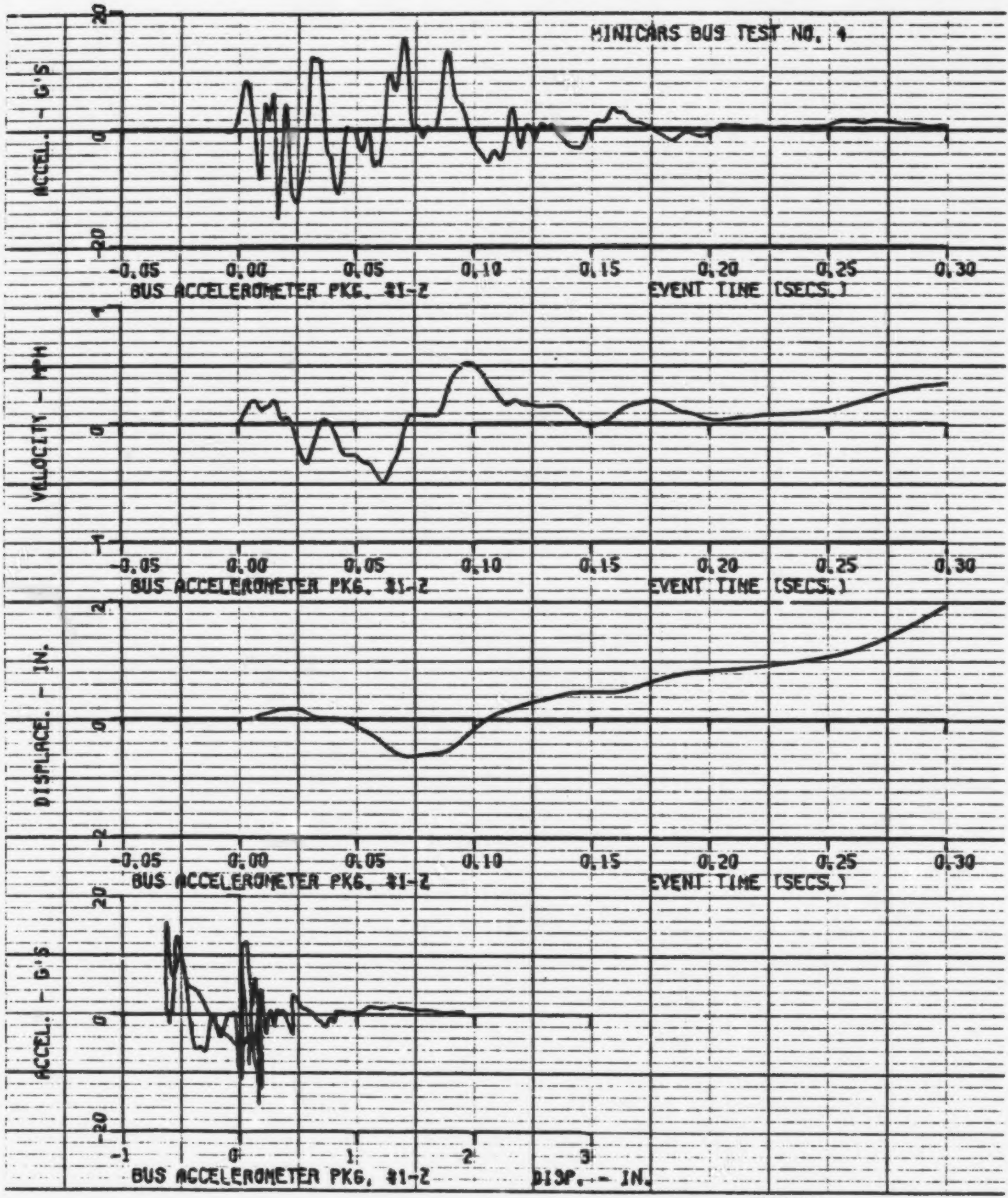
	FILTER CHANNEL CLASS
VEHICLE DATA	60
HEAD ACCELERATION	1000
CHEST ACCELERATION	180
BELT LOADS	60
FEMUR LOADS	600


MINICARS BUS TEST NO. 4
ACCEL. - G'S (X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-X
EVENT TIME (SECS.)
VELOCITY - MPH
40
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-X
EVENT TIME (SECS.)
DISPLACE. - IN.
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-X
EVENT TIME (SECS.)
ACCEL. - G'S (X10¹)
10
0
-10
0
10
20
30
40
BUS ACCELEROMETER PKG. #1-X
DISP. - IN.

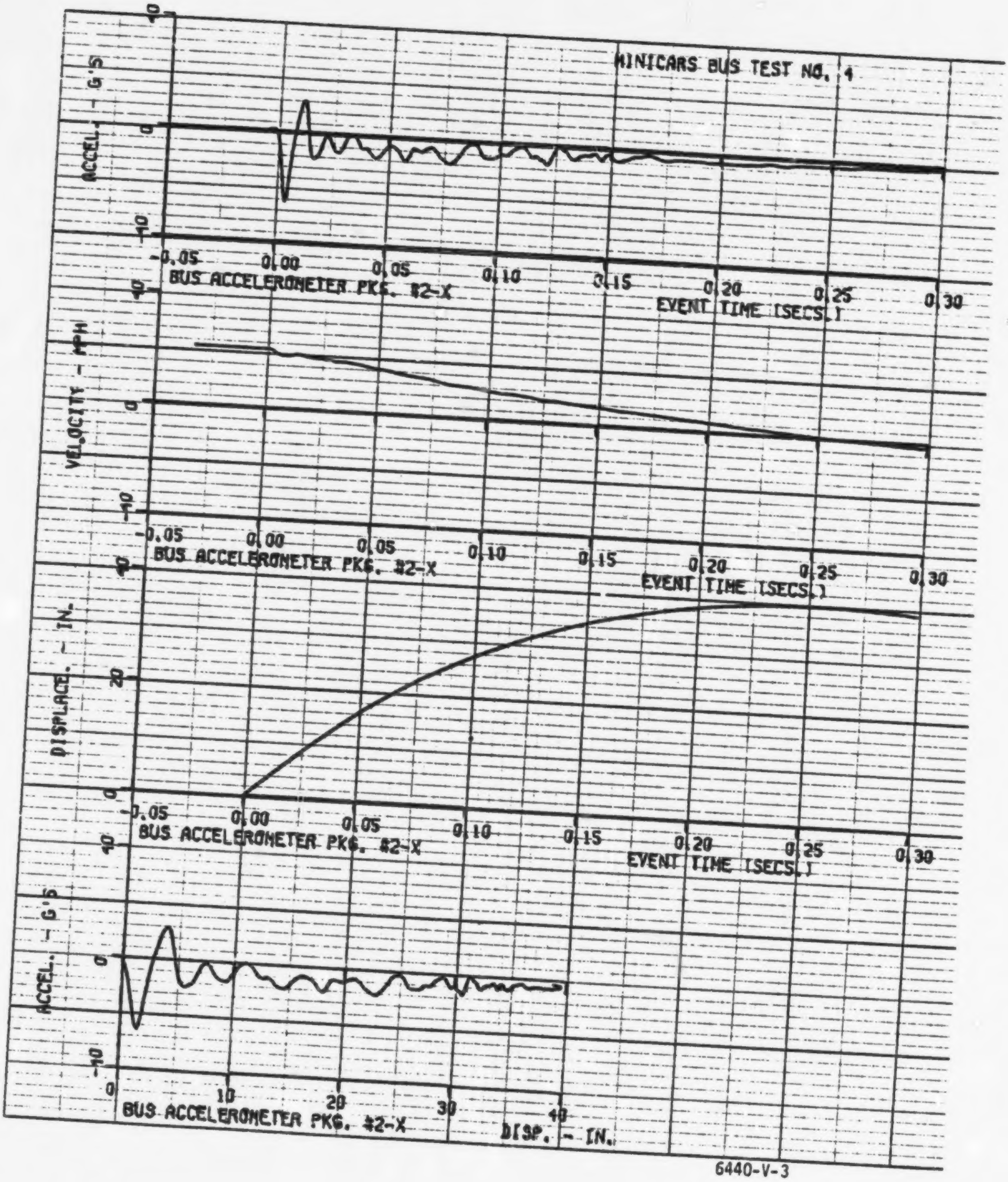
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Y
EVENT TIME (SECS.)
VELOCITY - MPH
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Y
EVENT TIME (SECS.)
DISPLACE. - IN.
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Y
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-2
0
2
4
6
BUS ACCELEROMETER PKG. #1-Y
DISP. - IN.

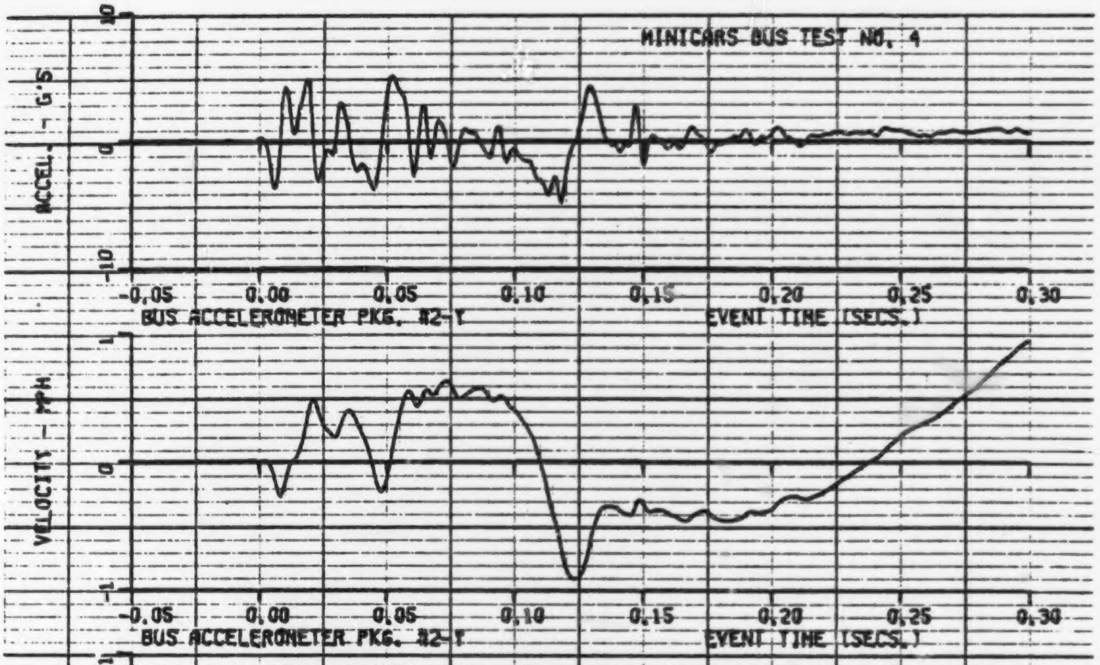
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Z
EVENT TIME (SECS.)
VELOCITY - MPH
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Z
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-1
0
1
2
3
BUS ACCELEROMETER PKG. #1-Z
DISP. - IN.

6440-V-3

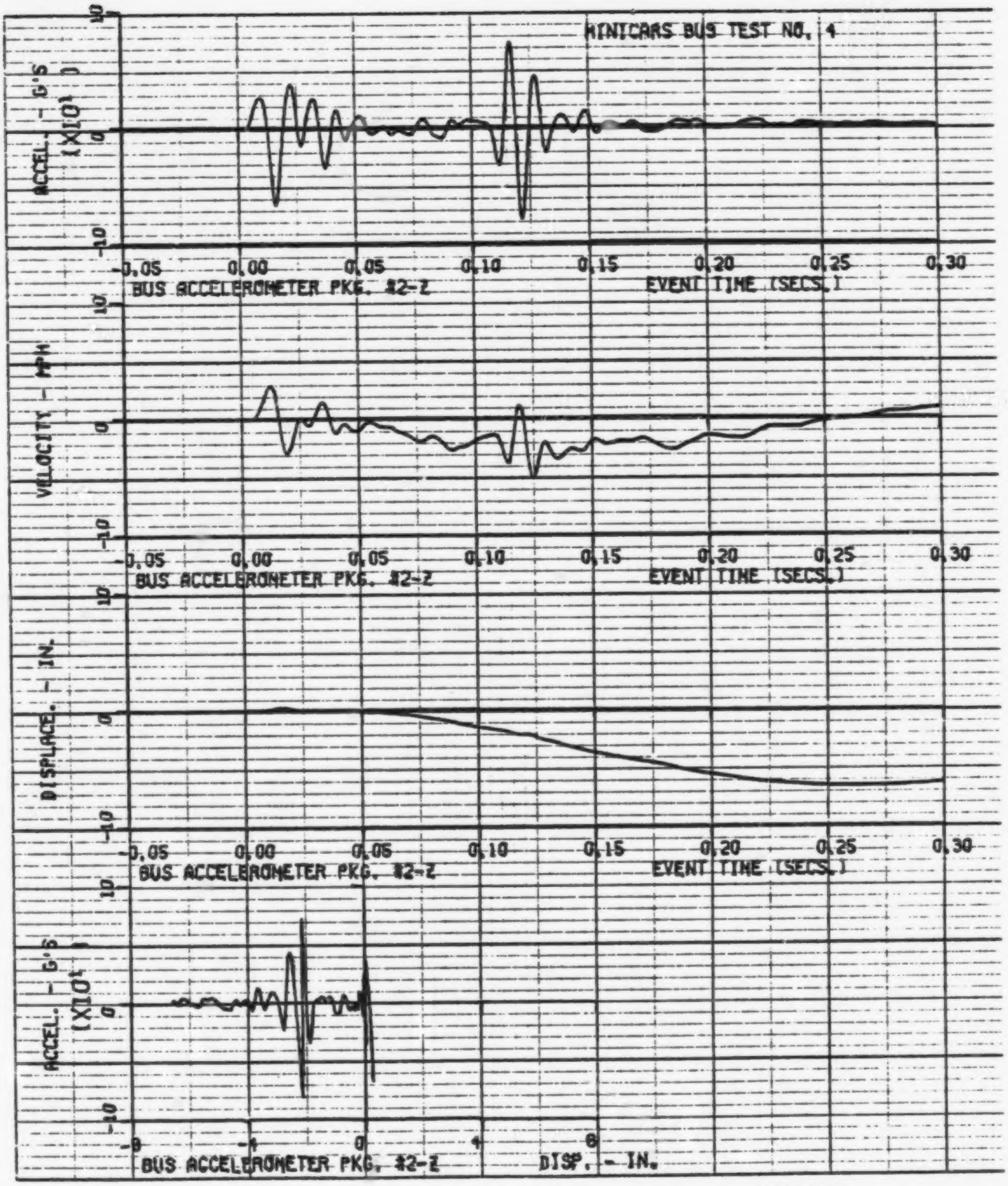

MINICARS BUS TEST NO. 4
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-X
EVENT TIME [SECS.]
VELOCITY - MPH
10
0
-10
BUS ACCELEROMETER PKG. #2-X
EVENT TIME [SECS.]
DISPLACE. - IN.
40
20
0
BUS ACCELEROMETER PKG. #2-X
EVENT TIME [SECS.]
ACCEL. - G'S
10
0
-10
0
10
20
30
40
BUS ACCELEROMETER PKG. #2-X
DISP. - IN.

6440-V-3

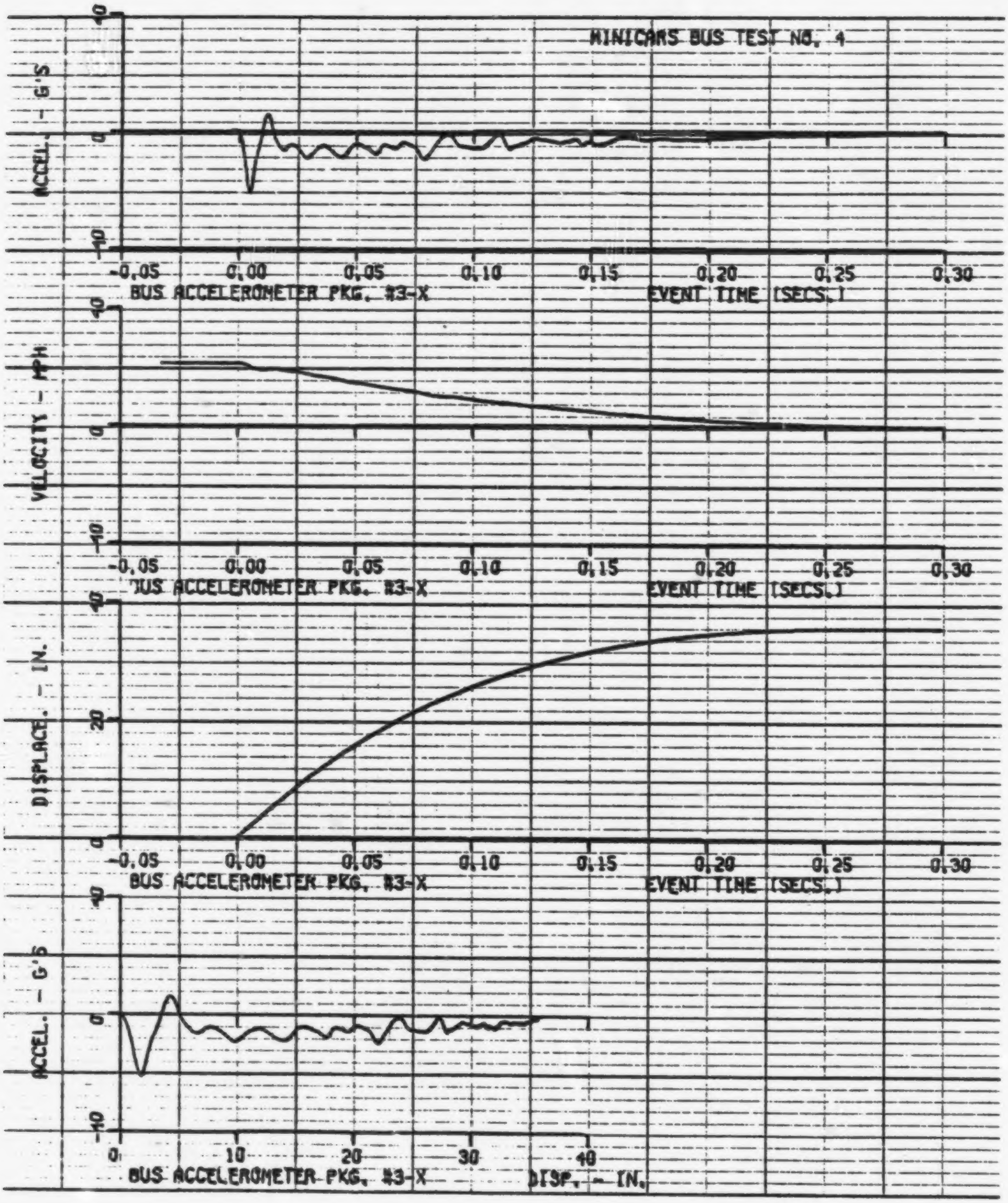

MINICARS BUS TEST NO. 4
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-Y
EVENT TIME (SECS.)
VELOCITY - MPH
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-Y
EVENT TIME (SECS.)
DISPLACE. - IN.
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-Y
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-4.00
0.00
4.00
8.00
12.00
(X10⁻¹)
BUS ACCELEROMETER PKG. #2-Y
DISP. - IN.

6440-V-3

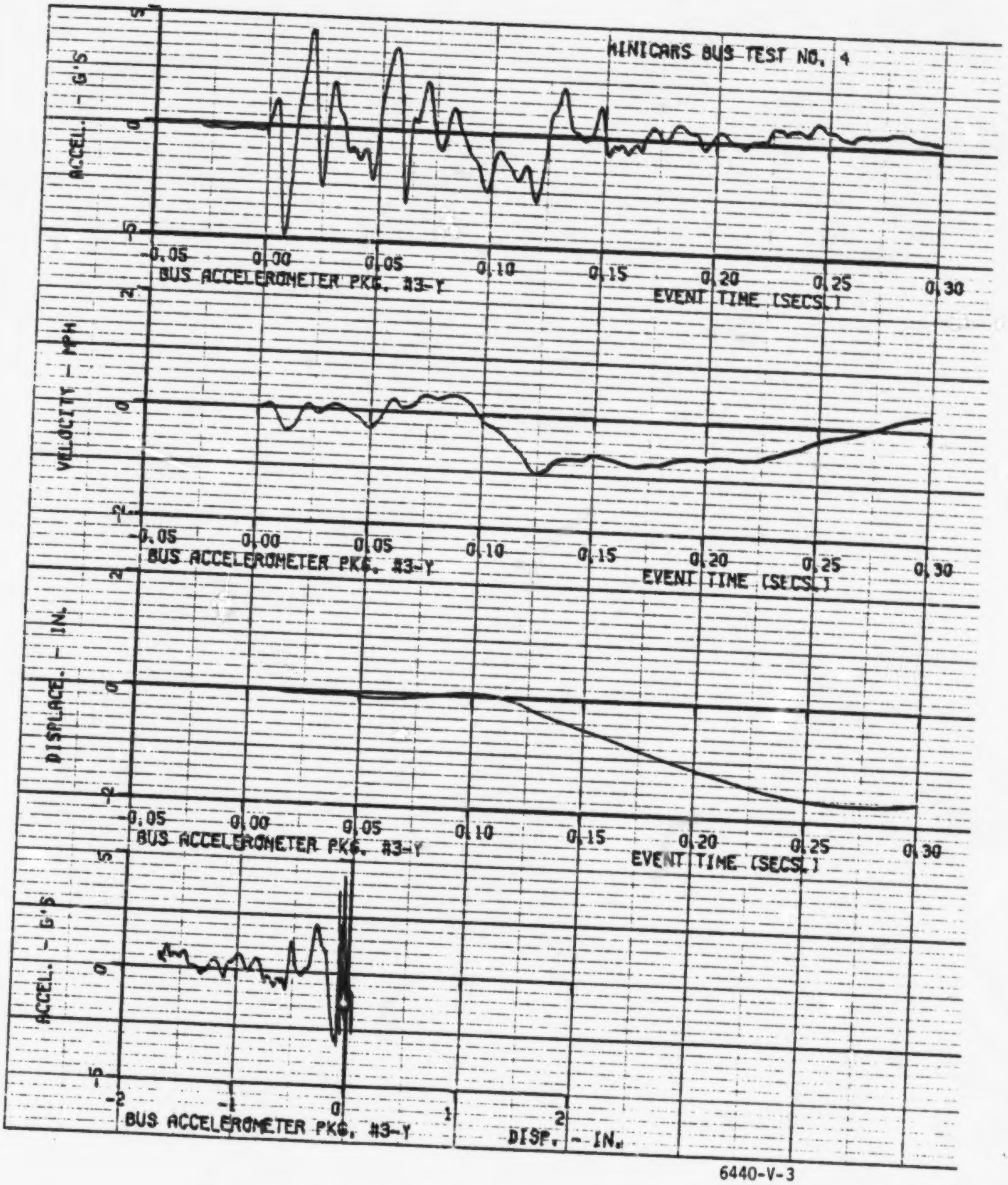
1860


MINICARS BUS TEST NO. 4
ACCEL. - G'S (X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-Z
EVENT TIME (SECS.)
VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-Z
EVENT TIME (SECS.)
ACCEL. - G'S (X10¹)
10
0
-10
-8
-4
0
4
8
BUS ACCELEROMETER PKG. #2-Z
DISP. - IN.

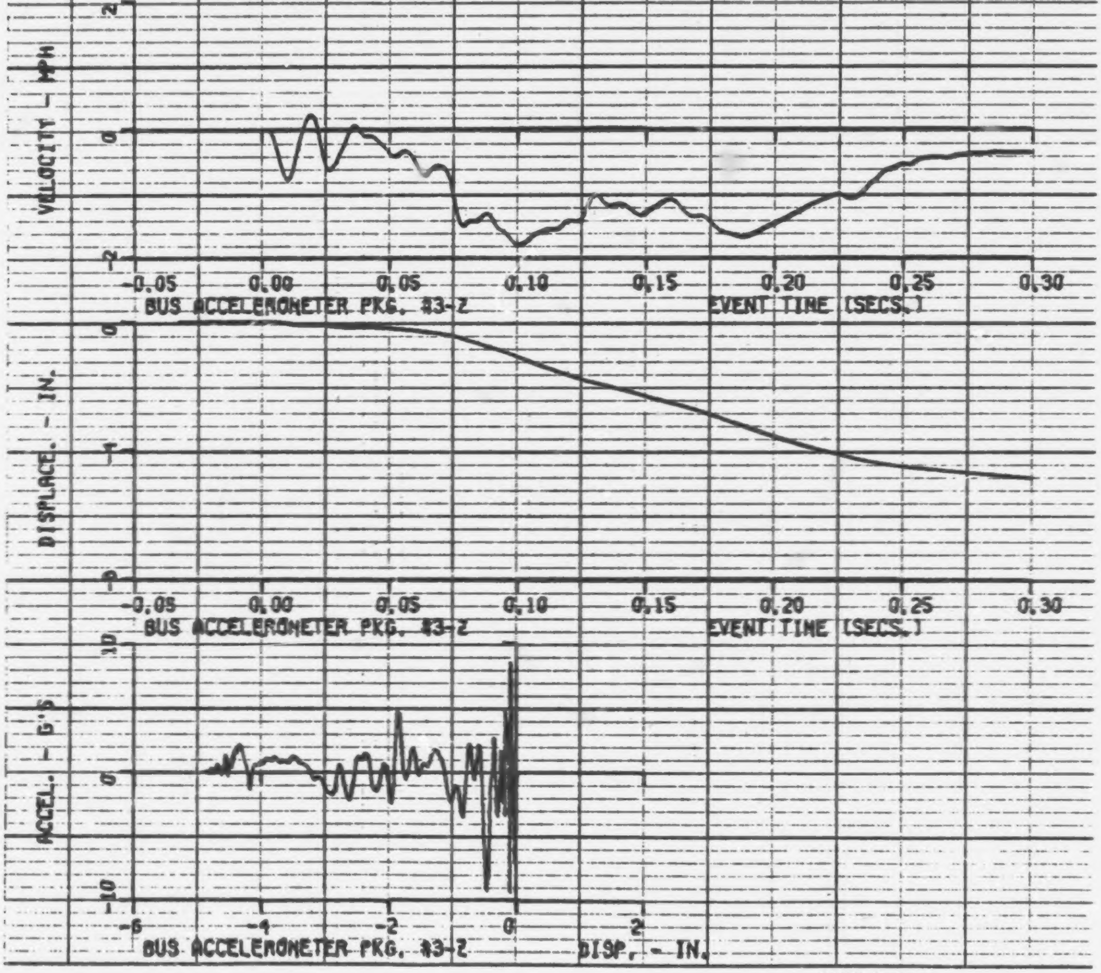
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-X
EVENT TIME (SECS.)
VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-X
EVENT TIME (SECS.)
DISPLACE. - IN.
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-X
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
0
10
20
30
40
BUS ACCELEROMETER PKG. #3-X
DISP. - IN.

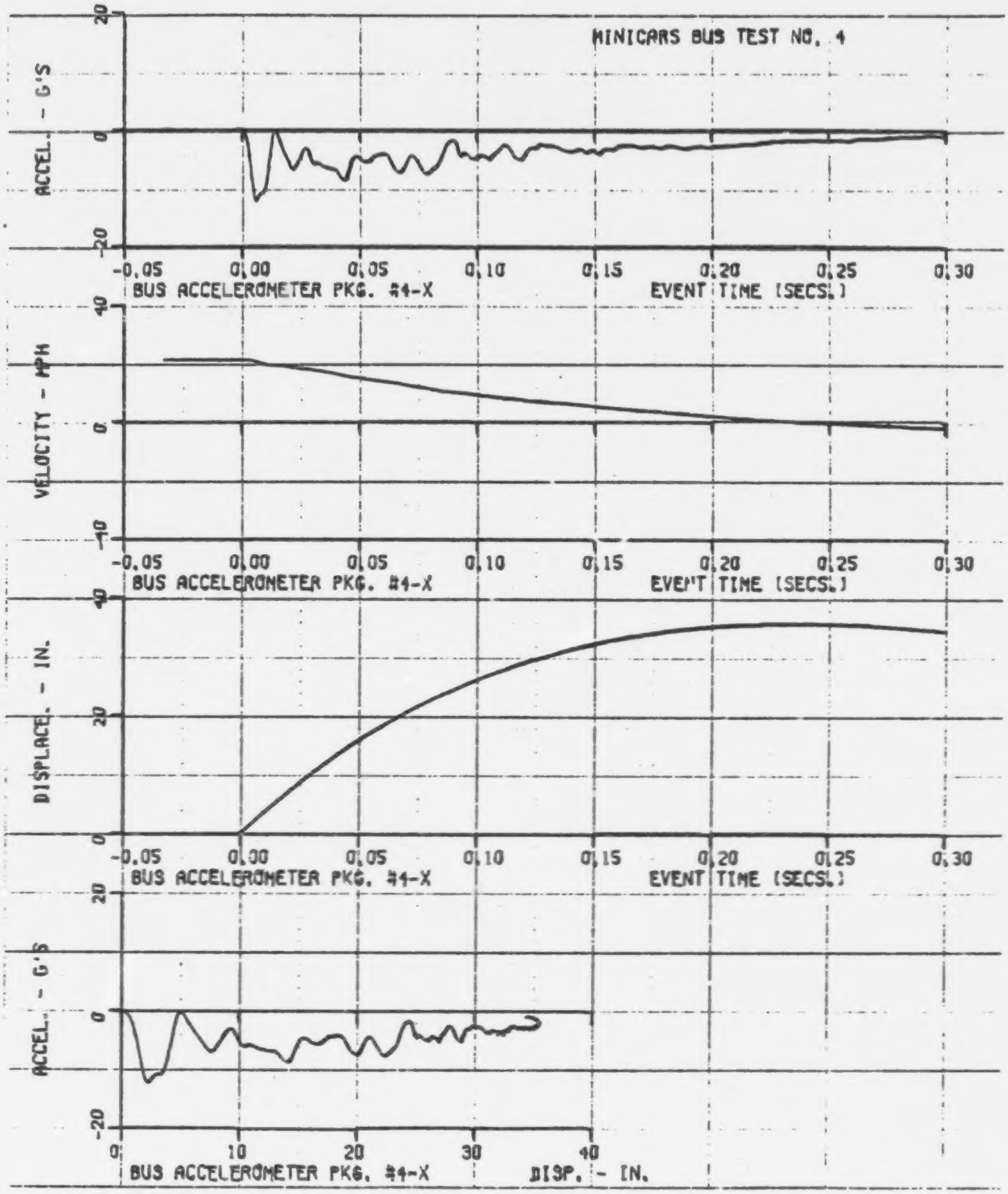
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-Y
EVENT TIME [SECS.]
VELOCITY - MPH
2
0
-2
DISPLACE. - IN.
ACCEL. - G'S
-2
-1
0
1
2
DISP. - IN.

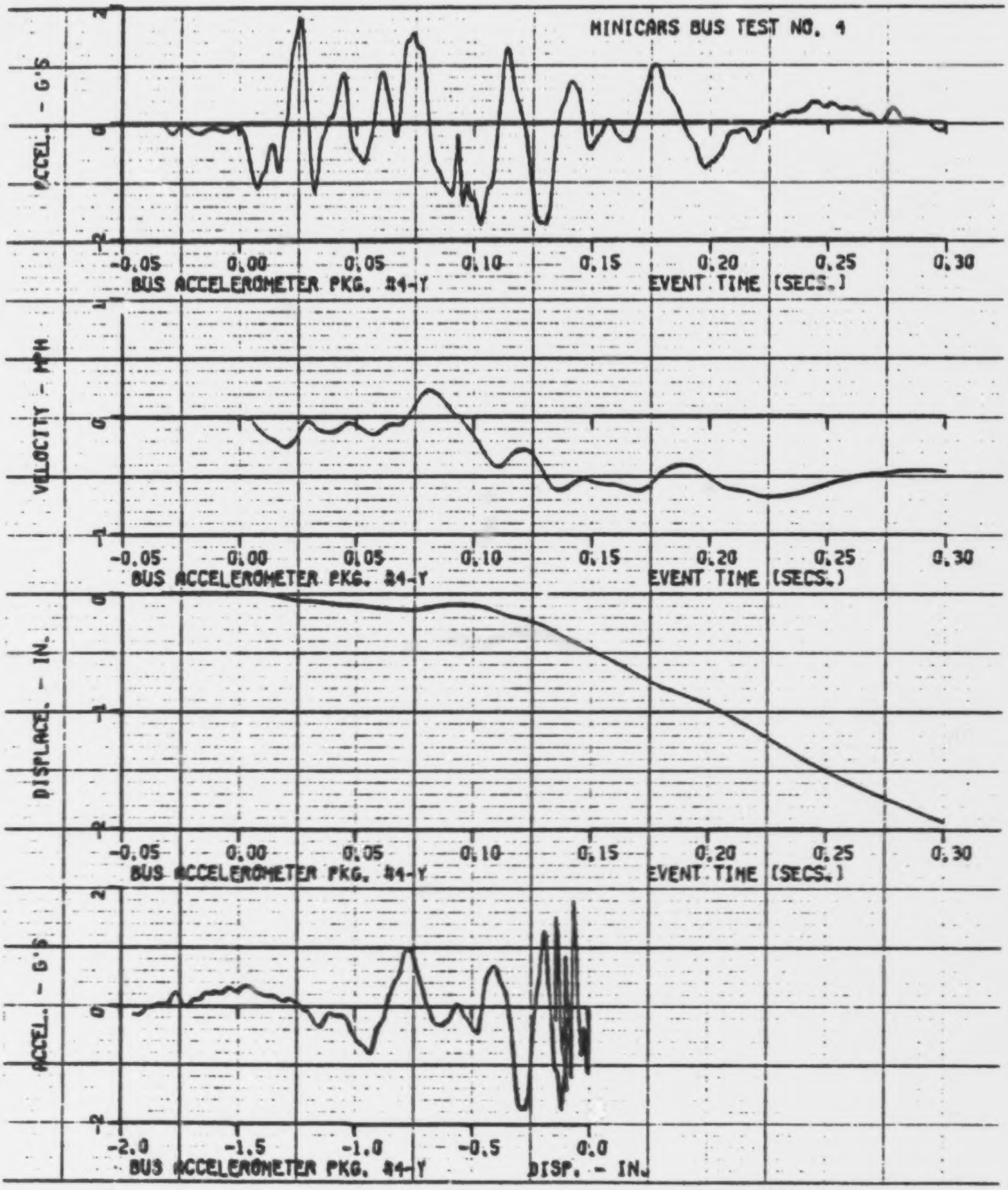
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-Z
EVENT TIME (SECS.)
VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-4
-8
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-Z
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-6
-4
-2
0
2
BUS ACCELEROMETER PKG. #3-Z
DISP. - IN.

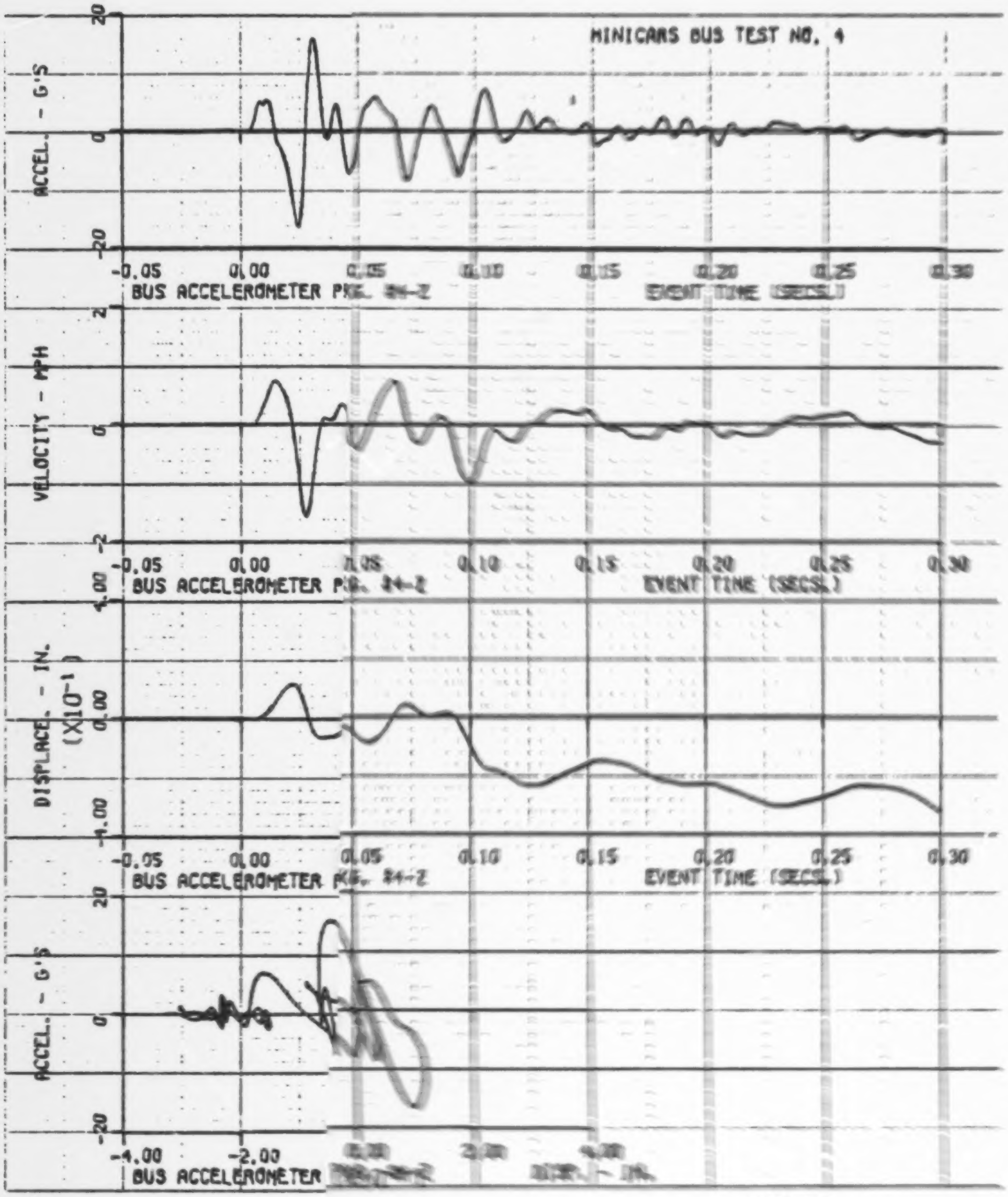
6440-V-3

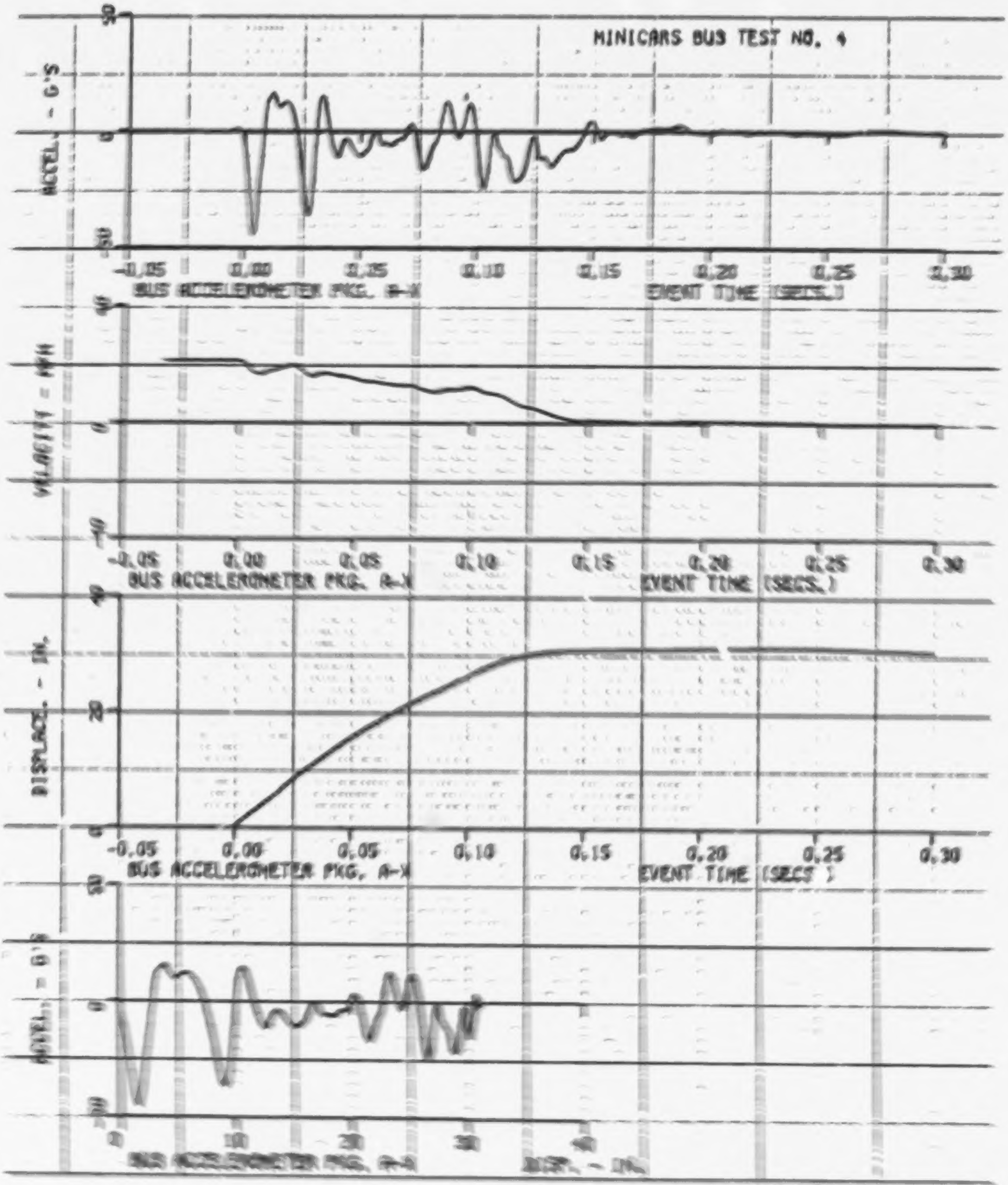

MINICARS BUS TEST NO. 4
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-X
EVENT TIME (SECS.)
VELOCITY - MPH
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-X
EVENT TIME (SECS.)
DISPLACE. - IN.
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-X
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
0
10
20
30
40
BUS ACCELEROMETER PKG. #4-X
DISP. - IN.

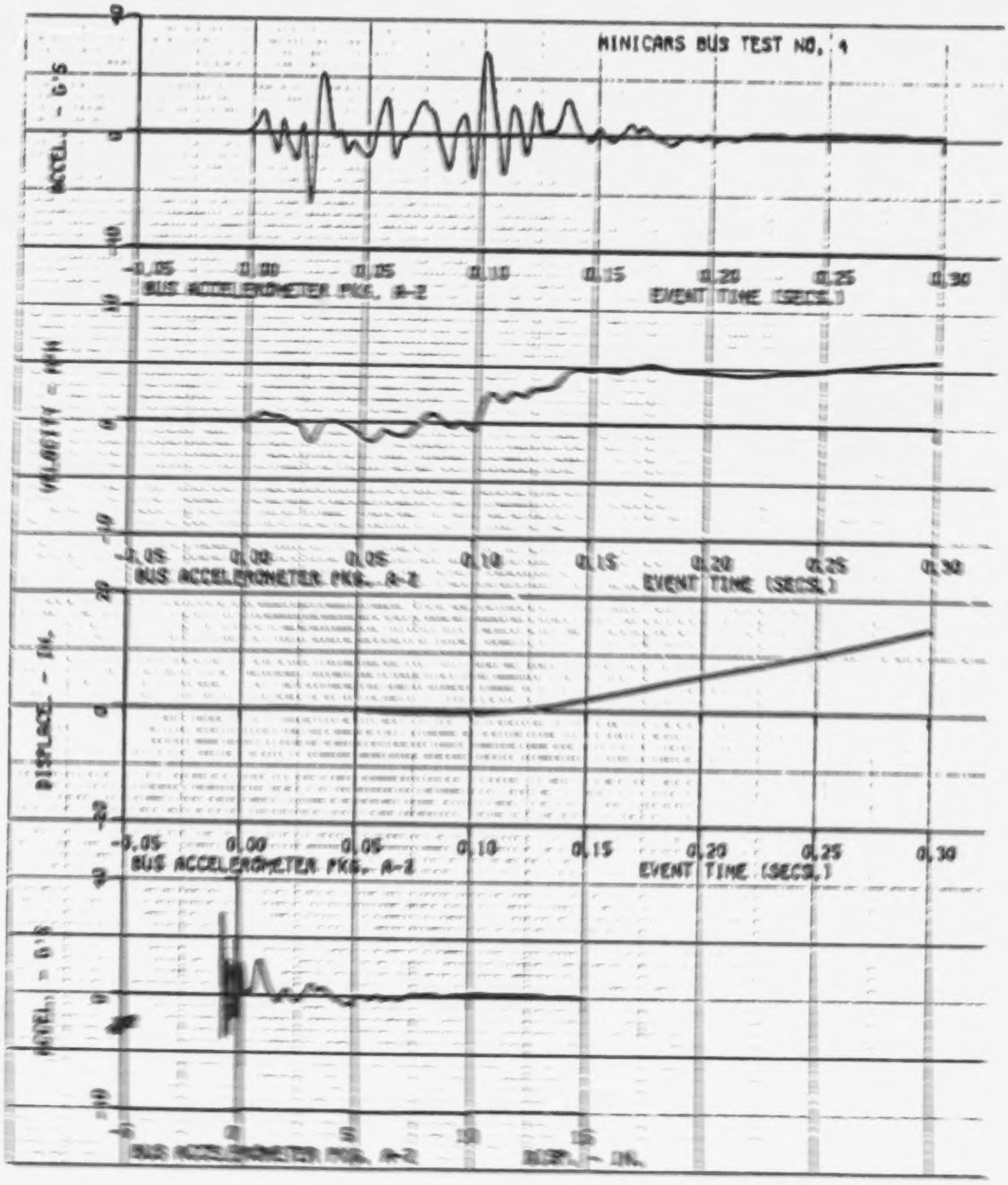
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-Y
EVENT TIME (SECS.)
VELOCITY - MPH
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-Y
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-1
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-Y
EVENT TIME (SECS.)
ACCEL. - G'S
2
0
-2
-2.0
-1.5
-1.0
-0.5
0.0
BUS ACCELEROMETER PKG. #4-Y
DISP. - IN.

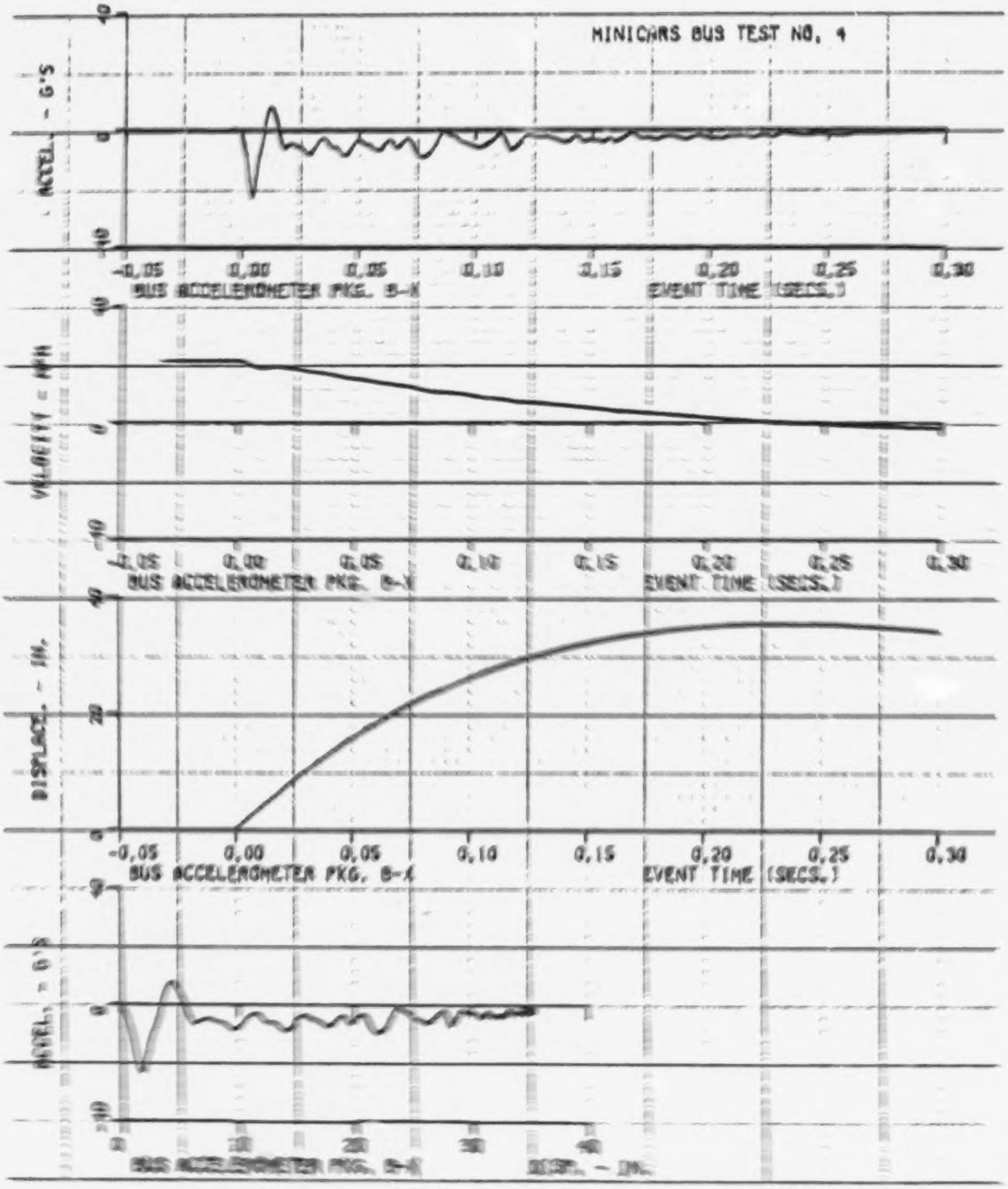
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. 34-Z
EVENT TIME (SECS.)
VELOCITY - MPH
2
0
-2
DISPLACE. - IN. (X10⁻¹)
4.00
0.00
-4.00
ACCEL. - G'S
-4.00
-2.00
0.00
2.00
4.00
BUS ACCELEROMETER PKG. 34-Z
DISP. - IN.

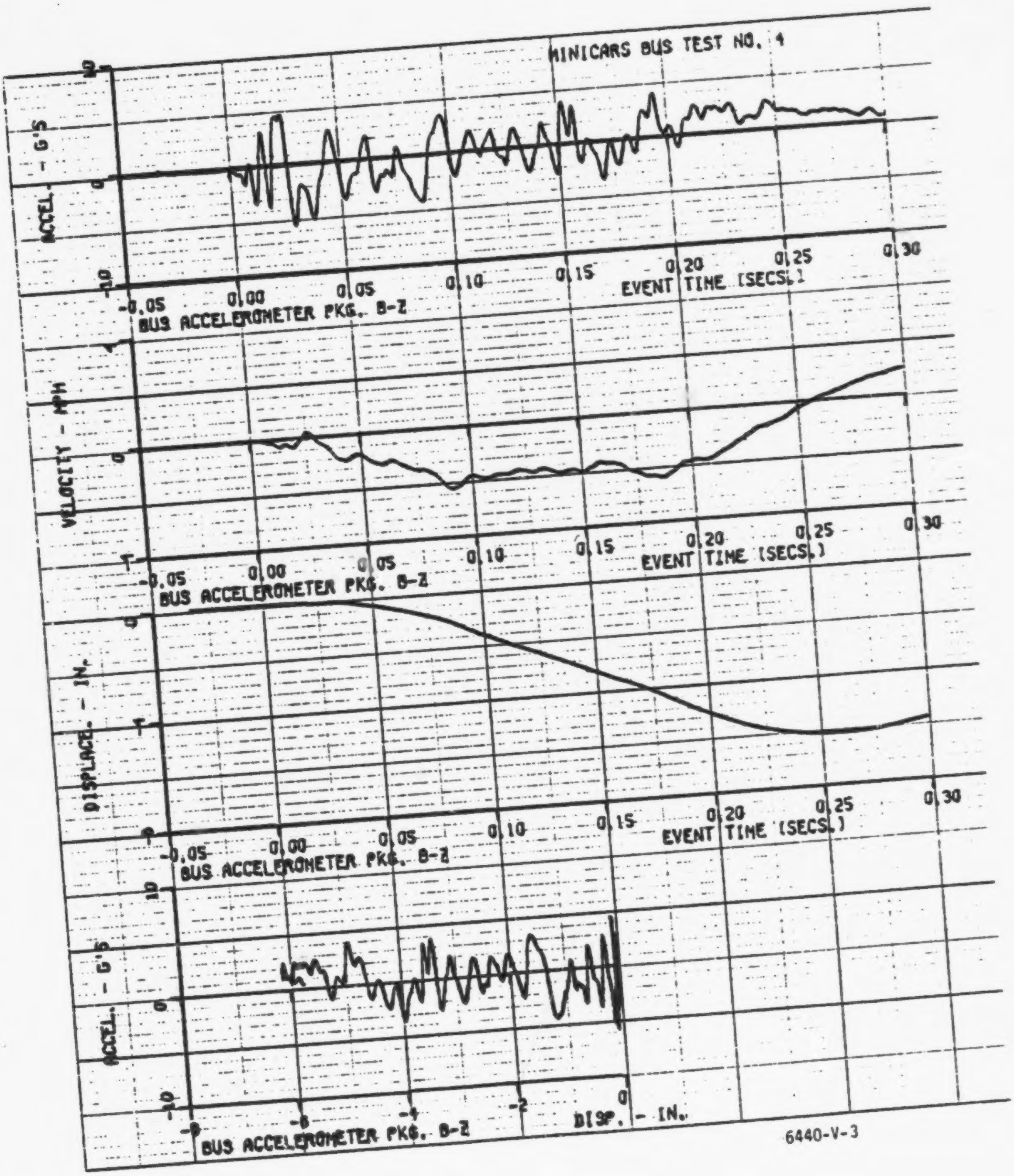

MINICARS BUS TEST NO. 4
ACCEL. - G'S
30
0
-30
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-X
EVENT TIME (SECS.)
VELOCITY - MPH
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-X
EVENT TIME (SECS.)
DISPLACE. - IN.
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-X
EVENT TIME (SECS.)
ACCEL. - G'S
30
0
-30
0
10
20
30
40
BUS ACCELEROMETER PKG. A-X
DISP. - IN.

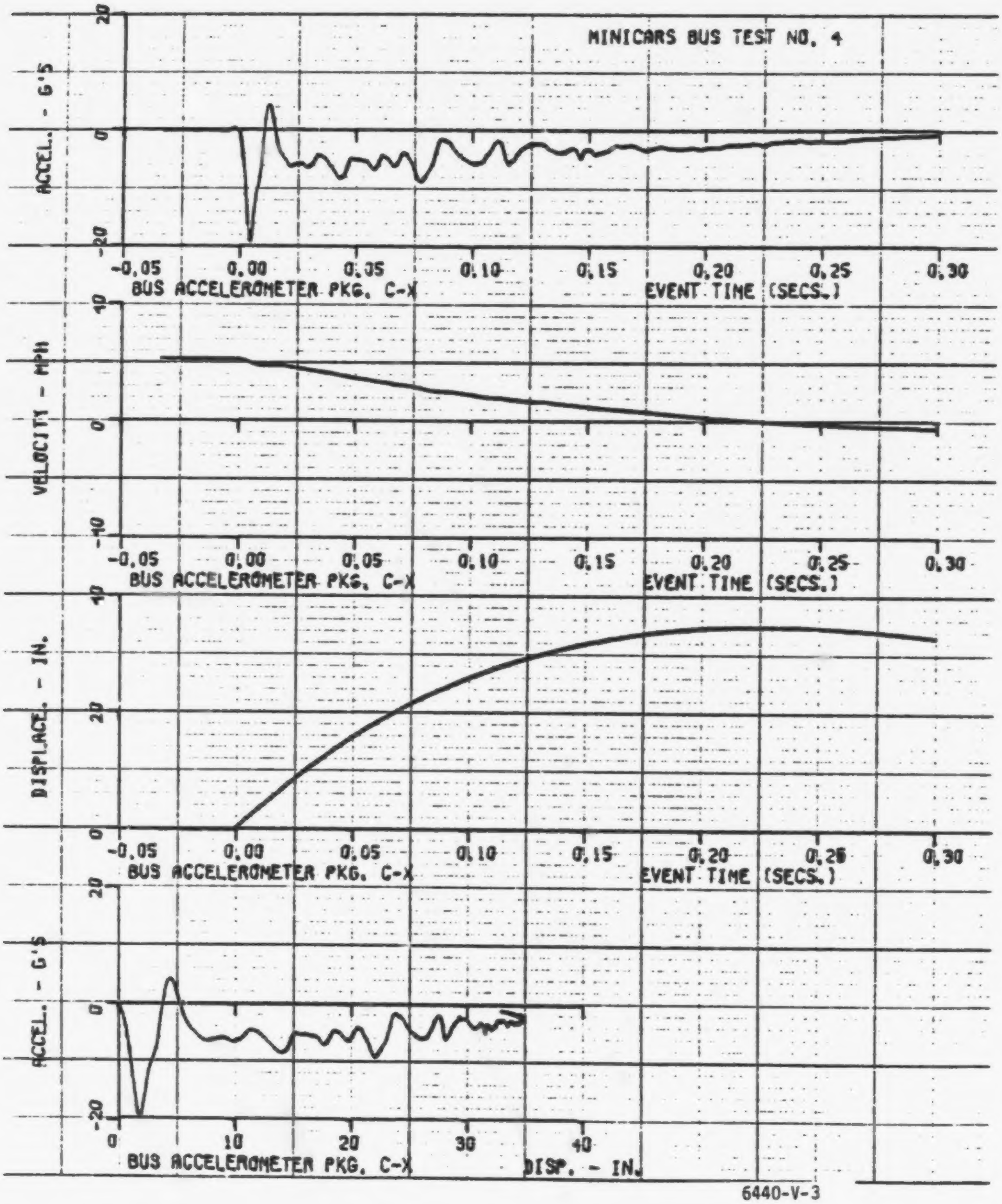

MINICARS BUS TEST NO. 4
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-2
EVENT TIME (SECS.)
VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-2
EVENT TIME (SECS.)
DISPLACE. - IN.
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-2
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-5
0
5
10
15
BUS ACCELEROMETER PKG. A-2
DISP. - IN.

6840-A-3

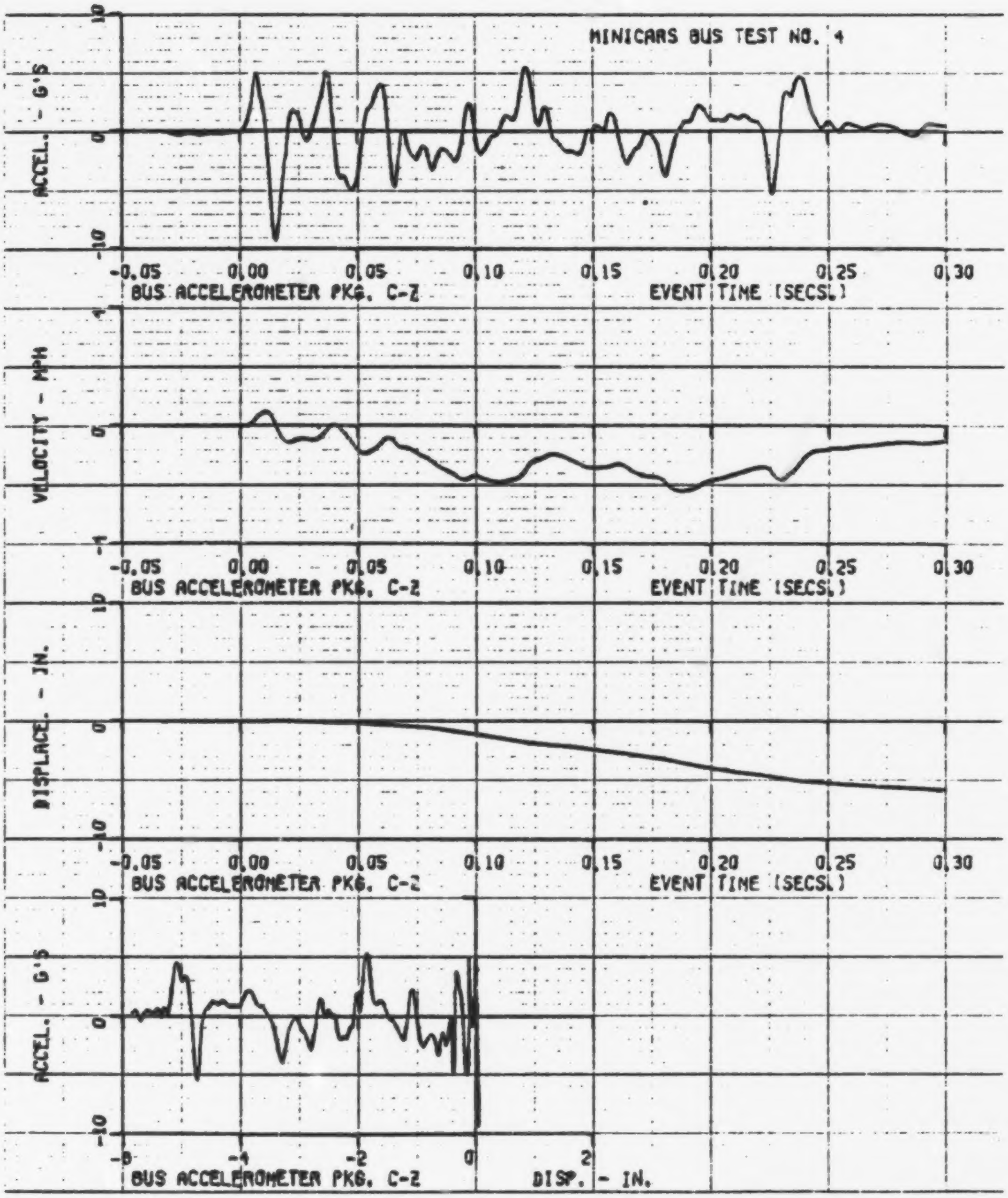

MINICARS BUS TEST NO. 4
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. B-X
EVENT TIME (SECS.)
VELOCITY - MPH
40
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. B-X
EVENT TIME (SECS.)
DISPLACE. - IN.
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. B-X
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
0
10
20
30
40
BUS ACCELEROMETER PKG. B-X
DISP. - IN.

196

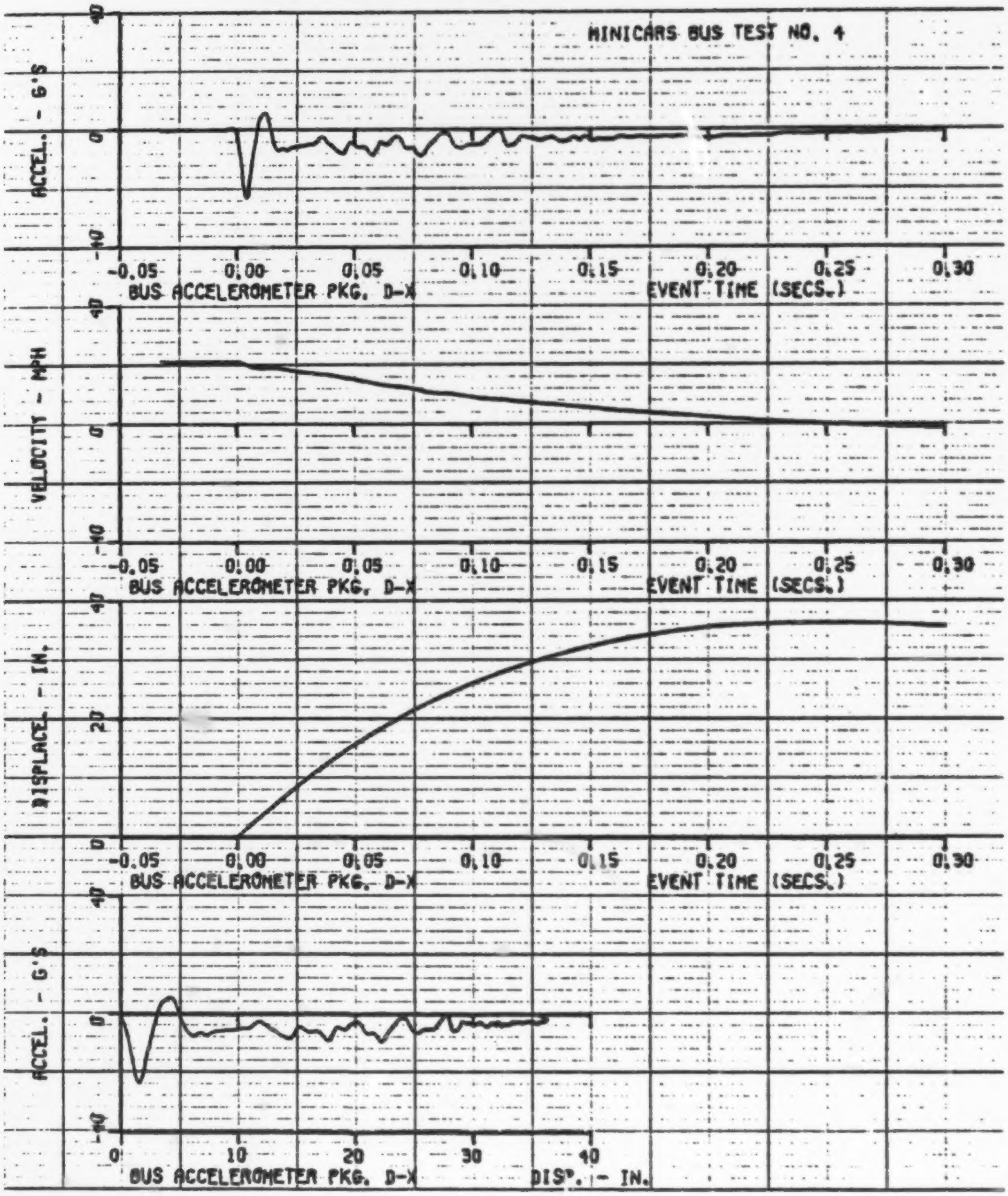

MINICARS BUS TEST NO. 4
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
BUS ACCELEROMETER PKG. B-Z
VELOCITY - MPH
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
BUS ACCELEROMETER PKG. B-Z
DISPLACE. - IN.
0
-4
-8
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
BUS ACCELEROMETER PKG. B-Z
ACCEL. - G'S
10
0
-10
-8
-6
-4
-2
0
DISP. - IN.
BUS ACCELEROMETER PKG. B-Z
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-X
EVENT TIME (SECS.)
VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-X
EVENT TIME (SECS.)
DISPLACE. - IN.
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-X
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
0
10
20
30
40
BUS ACCELEROMETER PKG. C-X
DISP. - IN.

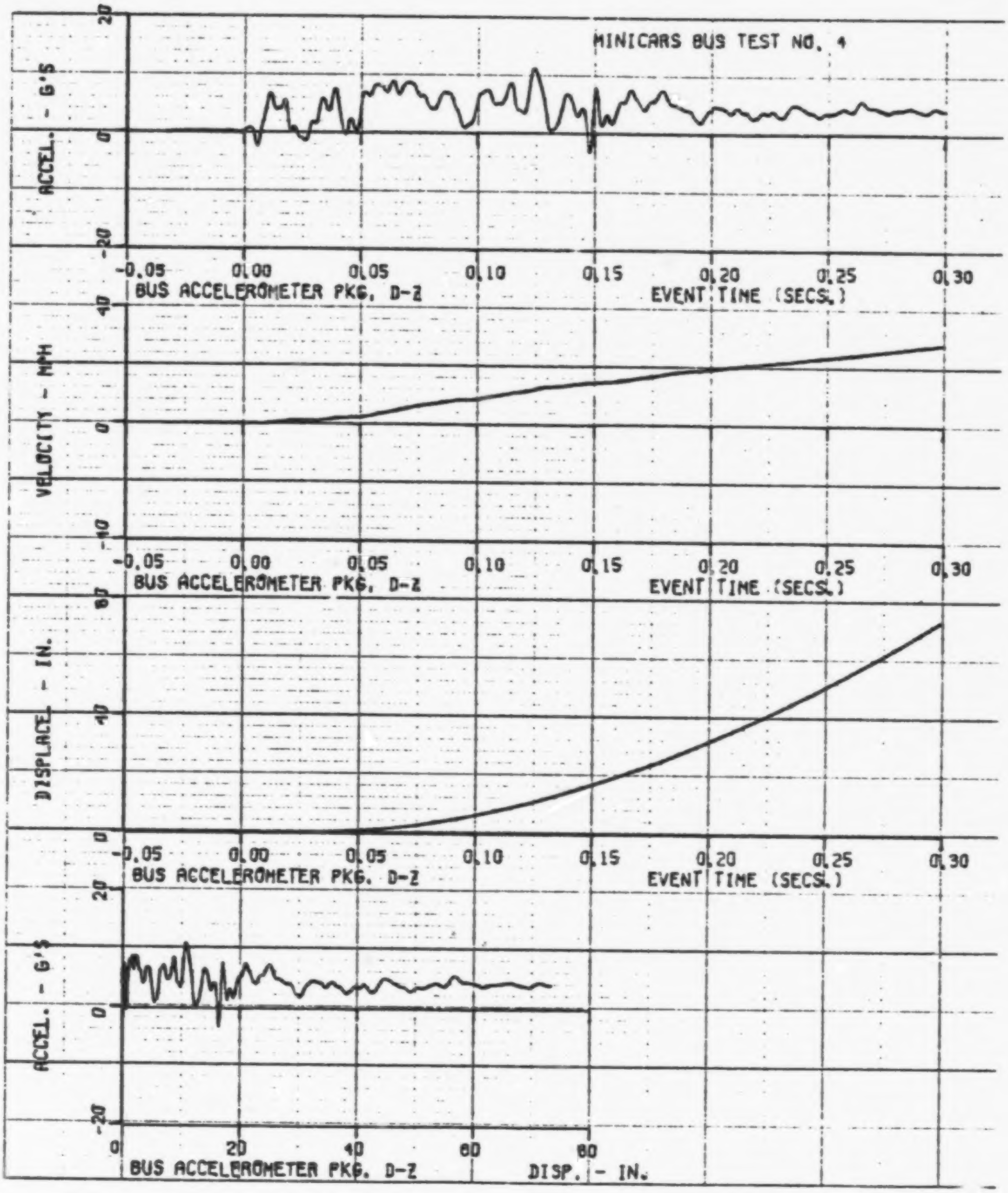
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-Z
EVENT TIME (SECS.)
VELOCITY - MPH
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-Z
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-6
-4
-2
0
2
BUS ACCELEROMETER PKG. C-Z
DISP. - IN.

6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. D-X
EVENT TIME (SECS.)
VELOCITY - MPH
40
0
-40
BUS ACCELEROMETER PKG. D-X
EVENT TIME (SECS.)
DISPLACE. - IN.
40
20
0
BUS ACCELEROMETER PKG. D-X
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
0
10
20
30
40
BUS ACCELEROMETER PKG. D-X
DIS. - IN.

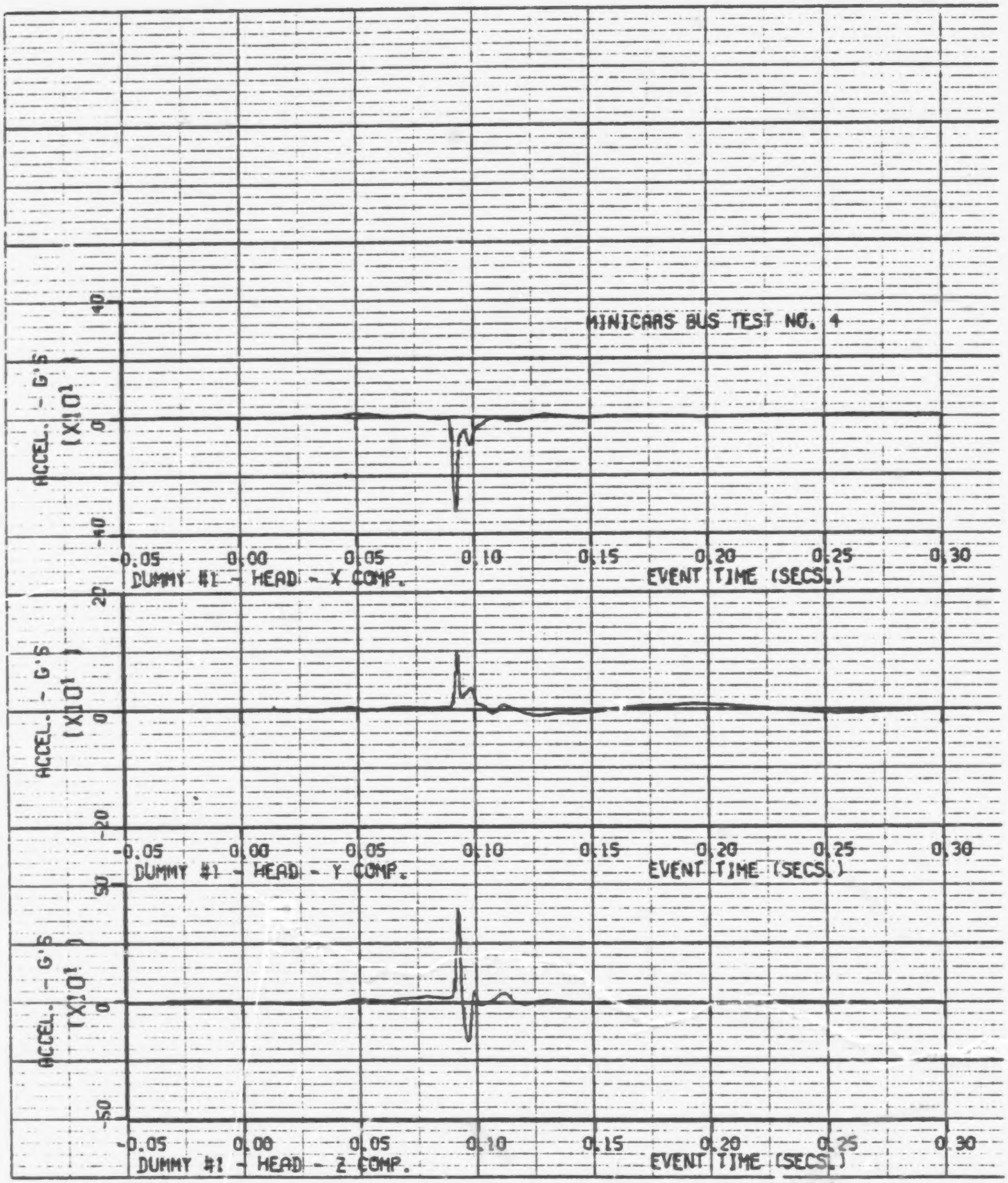
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. D-Z
EVENT TIME (SECS.)
VELOCITY - MPH
40
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. D-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
80
40
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. D-Z
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
0
20
40
60
80
BUS ACCELEROMETER PKG. D-Z
DISP. - IN.

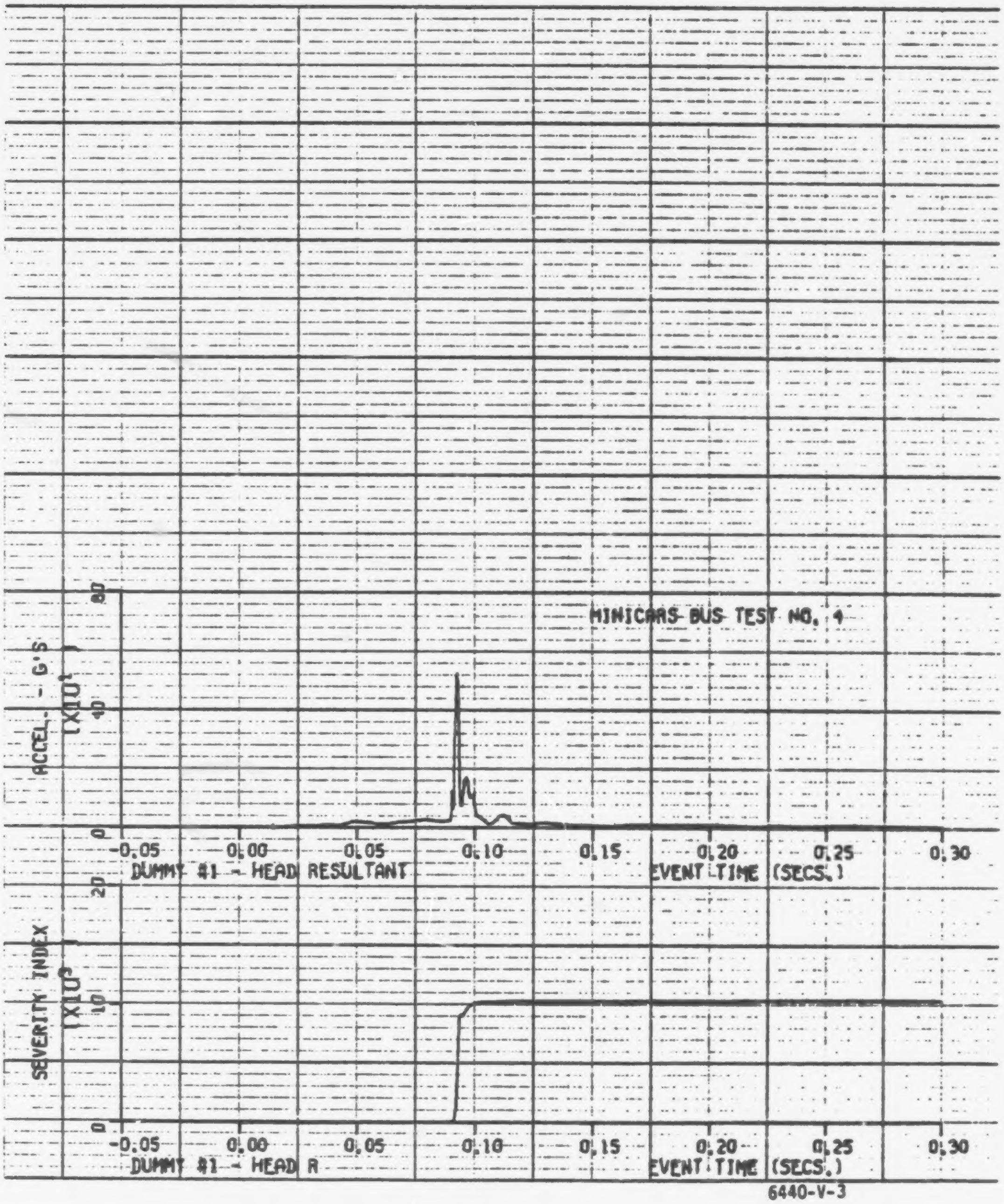
6440-V-3

BLANK PAGE

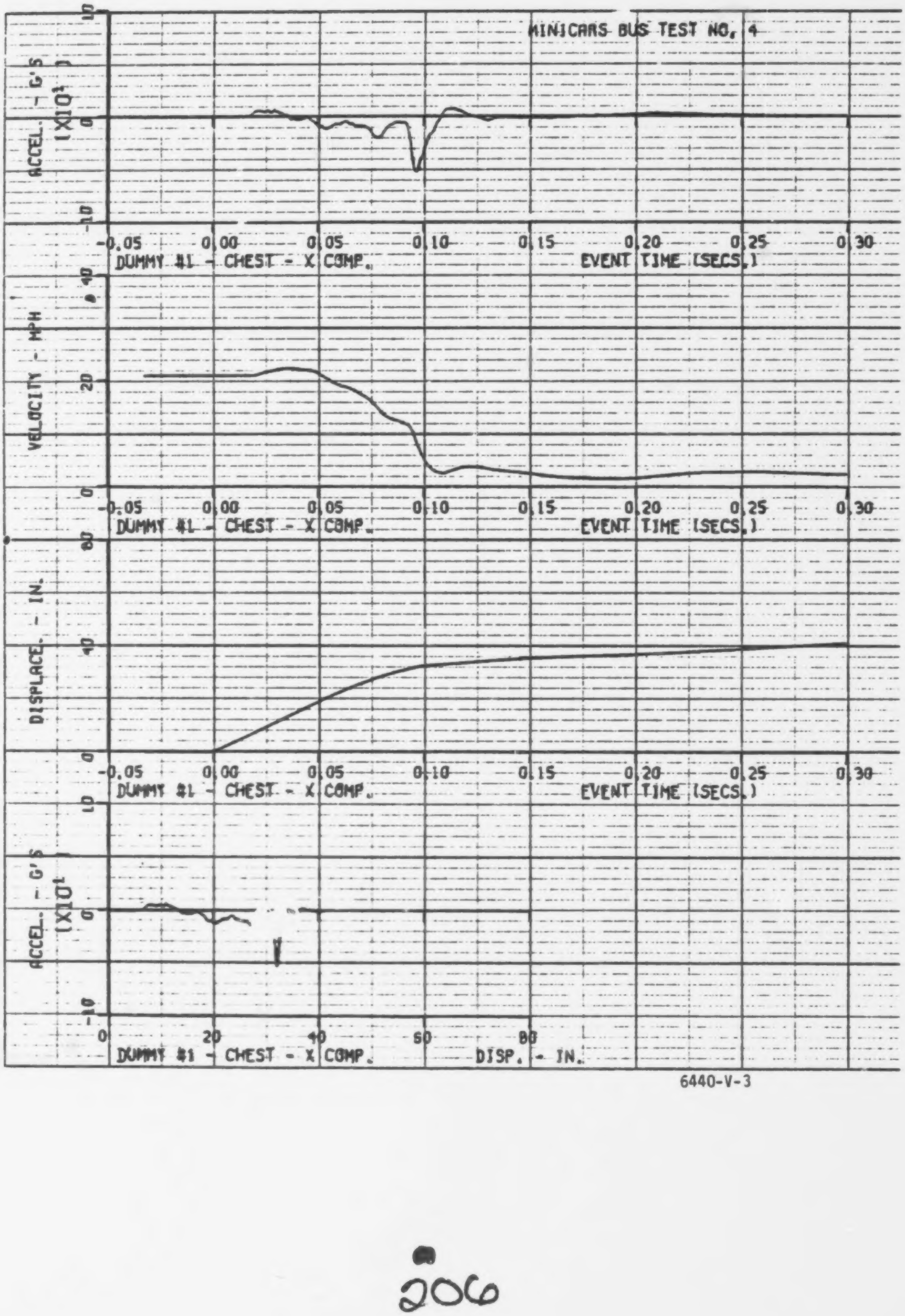
DUMMY DATA


MINICARS BUS TEST NO. 4
ACCEL. - G'S (X10¹)
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - HEAD - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S (X10¹)
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - HEAD - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S (X10¹)
50
0
-50
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - HEAD - Z COMP.
EVENT TIME (SECS.)

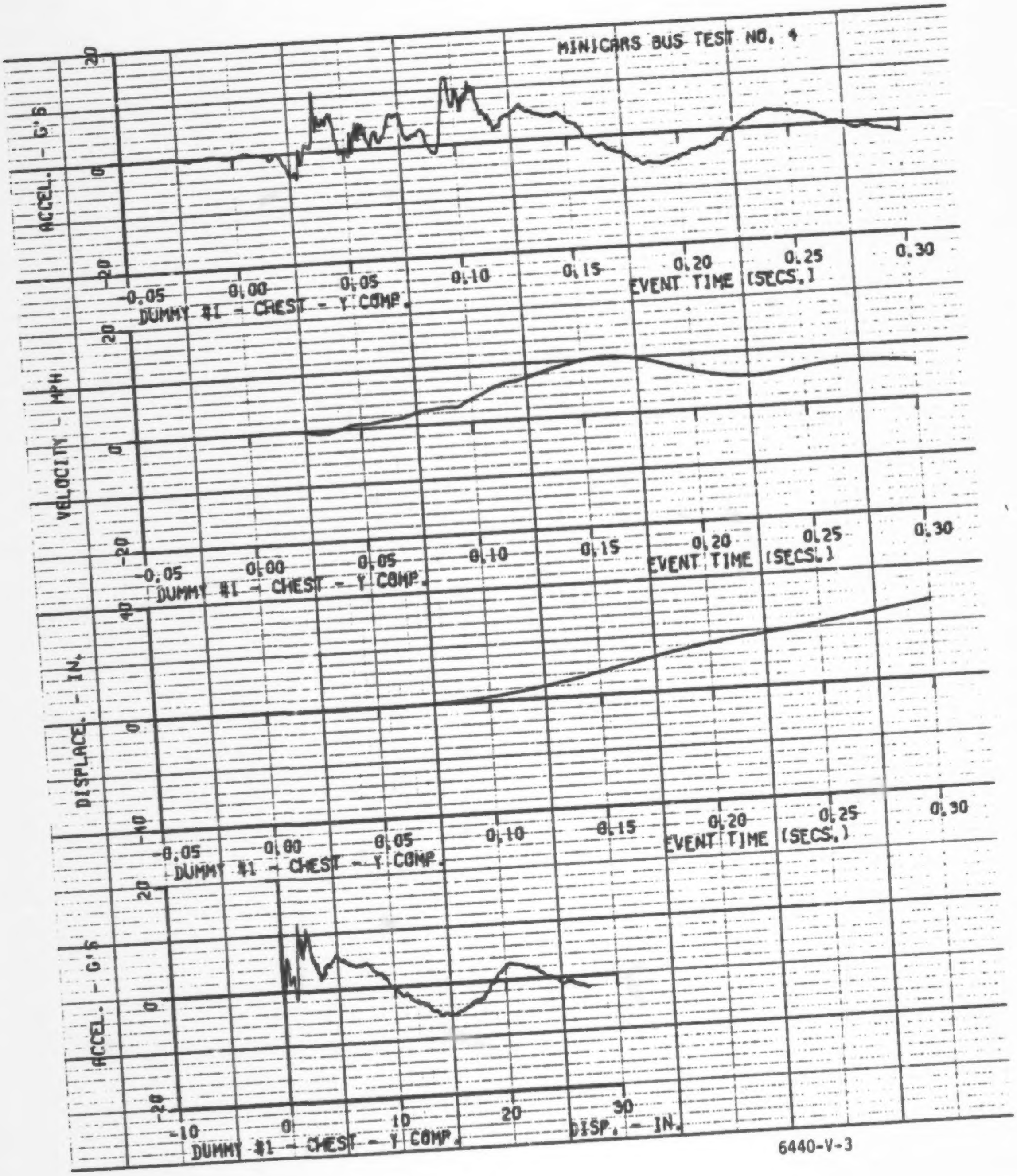
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
(X10¹)
80
40
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
(X10³)
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - HEAD R
EVENT TIME (SECS.)

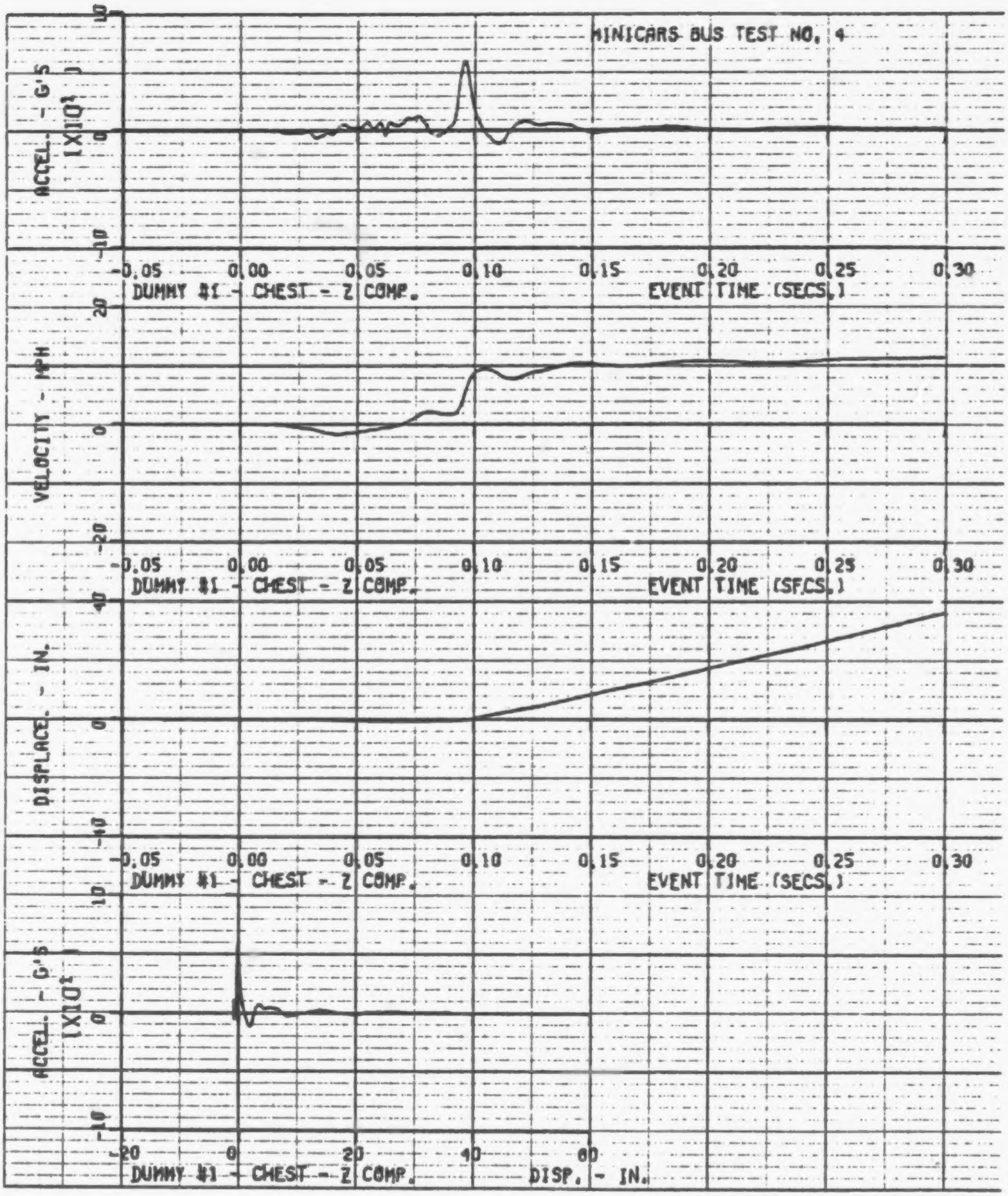
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S (X10¹)
10
0
-10
-0.05 0.00 0.05 0.10 0.15 0.20 0.25 0.30
DUMMY #1 - CHEST - X COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
40
20
0
-0.05 0.00 0.05 0.10 0.15 0.20 0.25 0.30
DUMMY #1 - CHEST - X COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
80
40
0
-0.05 0.00 0.05 0.10 0.15 0.20 0.25 0.30
DUMMY #1 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S (X10¹)
10
0
-10
0 20 40 60 80
DUMMY #1 - CHEST - X COMP.
DISP. - IN.

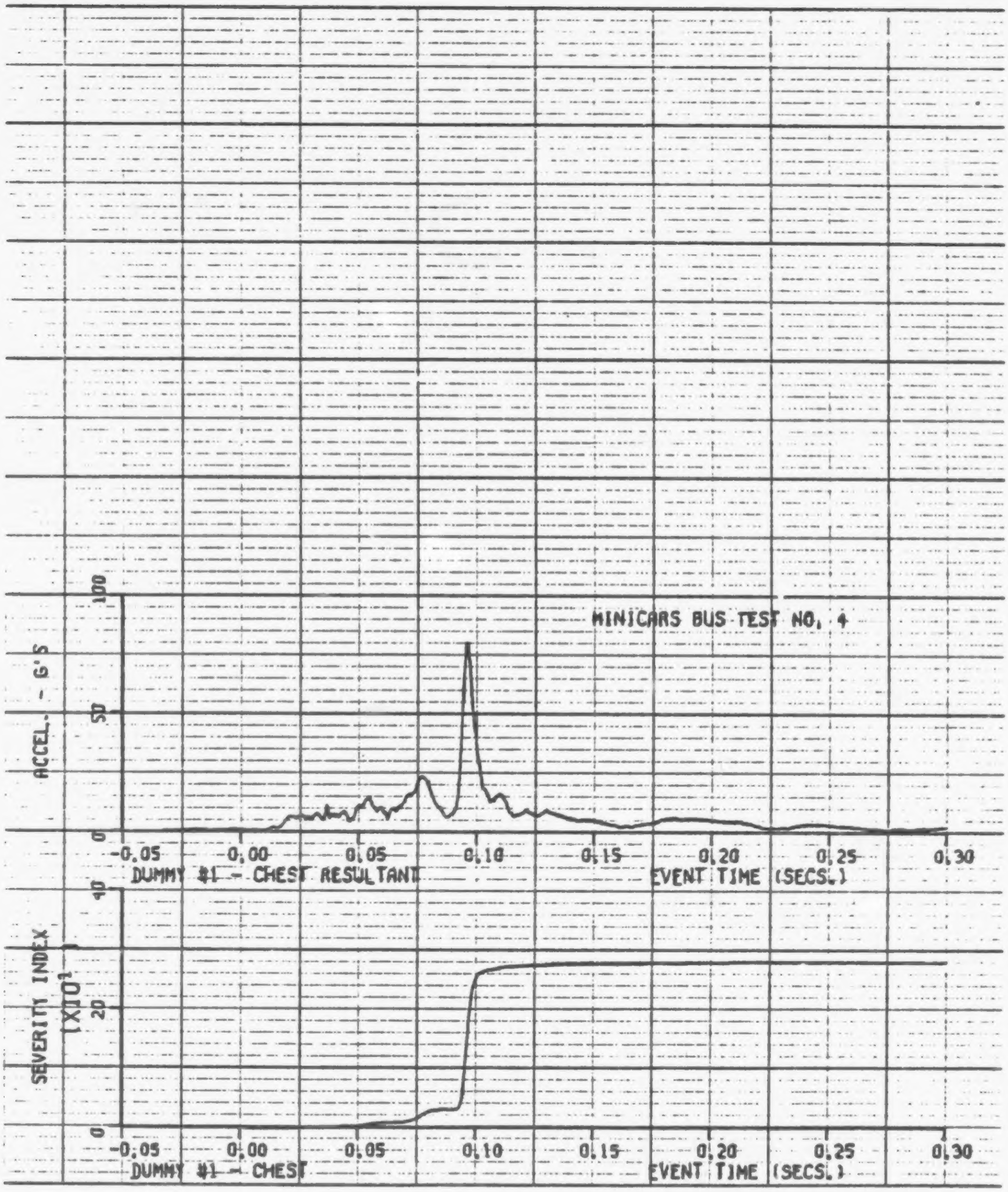
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
DUMMY #1 - CHEST - Y COMP.
VELOCITY - MPH
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
DUMMY #1 - CHEST - Y COMP.
DISPLACE. - IN.
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
DUMMY #1 - CHEST - Y COMP.
ACCEL. - G'S
20
0
-20
-10
0
10
20
30
DISP. - IN.
DUMMY #1 - CHEST - Y COMP.

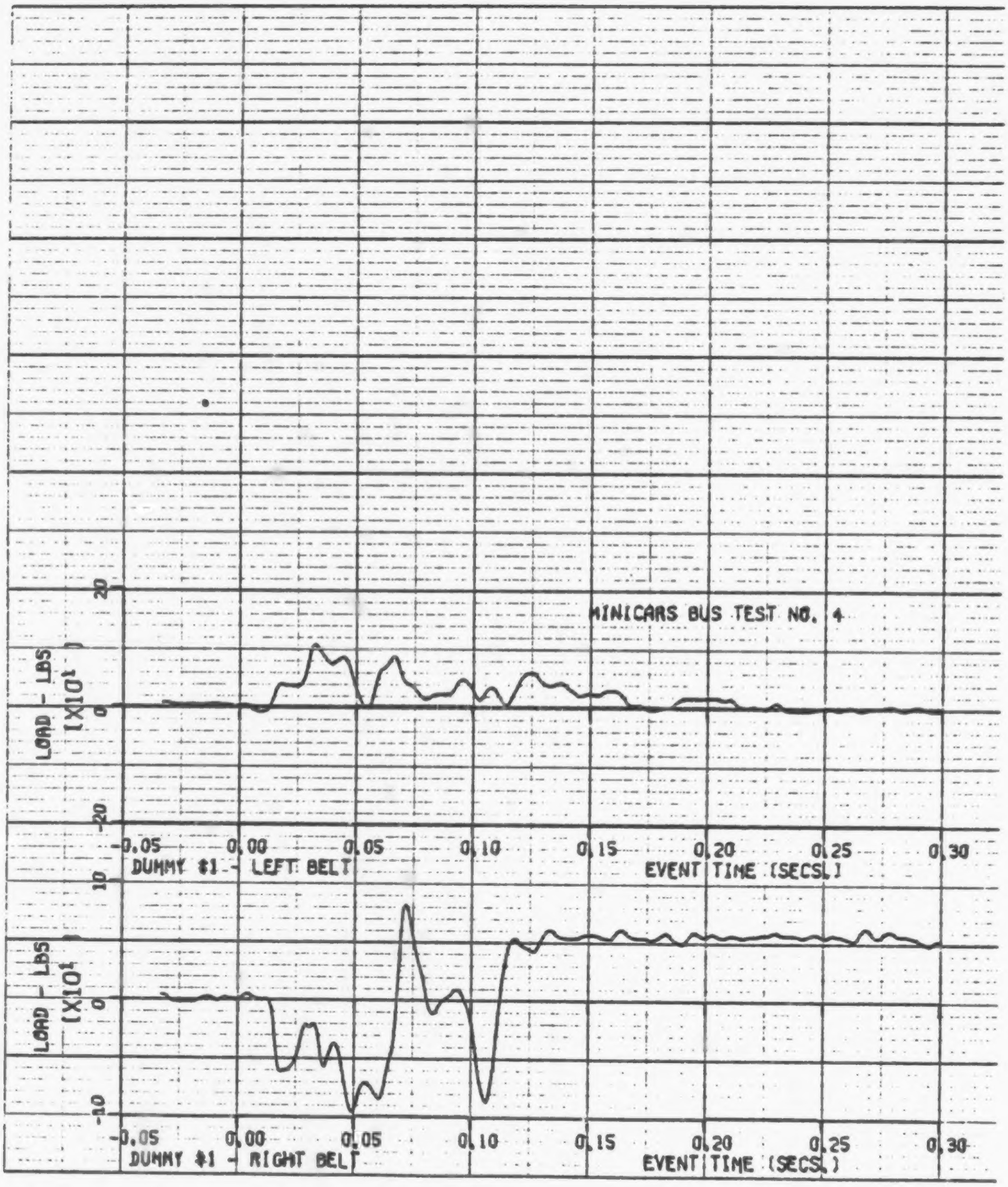
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S (X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST - Z COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST - Z COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST - Z COMP.
EVENT TIME (SECS.)
ACCEL. - G'S (X10¹)
10
0
-10
-20
0
20
40
60
DUMMY #1 - CHEST - Z COMP.
DISP. - IN.

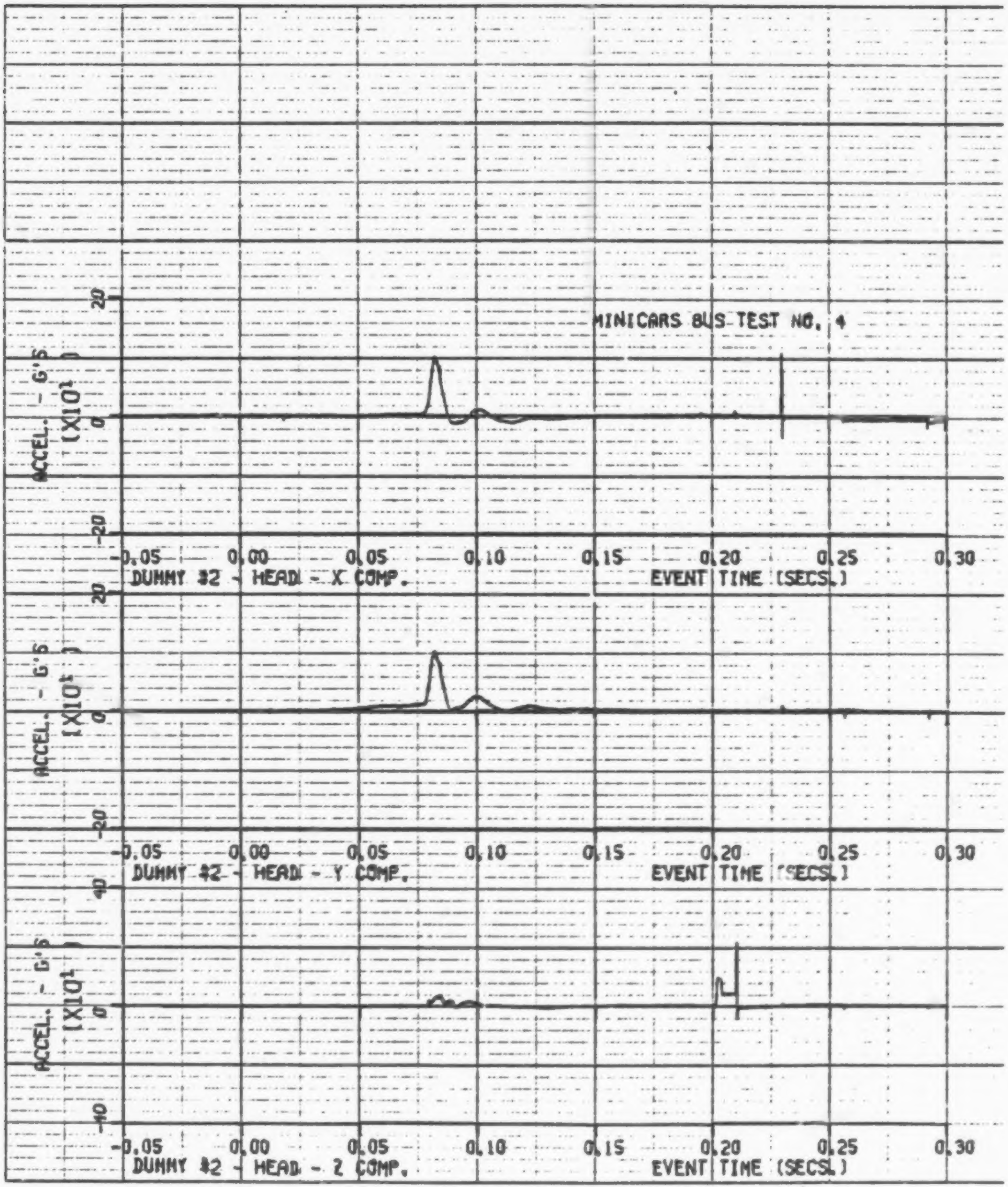
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
100
50
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX (X10¹)
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST
EVENT TIME (SECS.)

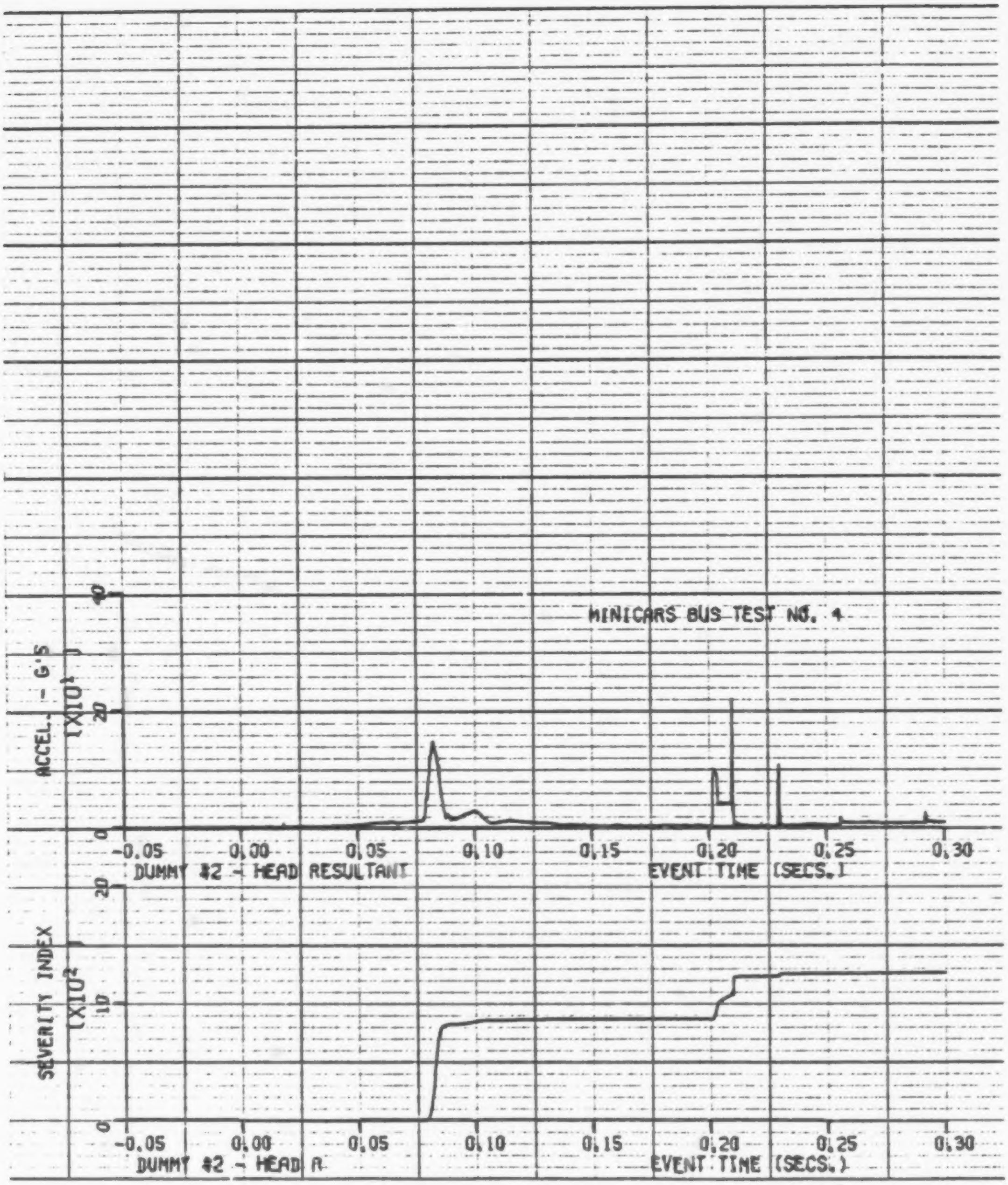
6440-V-3


MINICARS BUS TEST NO. 4
20
0
-20
LOAD - LBS
(X10^1)
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - LEFT BELT
EVENT TIME (SECS.)
10
0
-10
LOAD - LBS
(X10^1)
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - RIGHT BELT
EVENT TIME (SECS.)

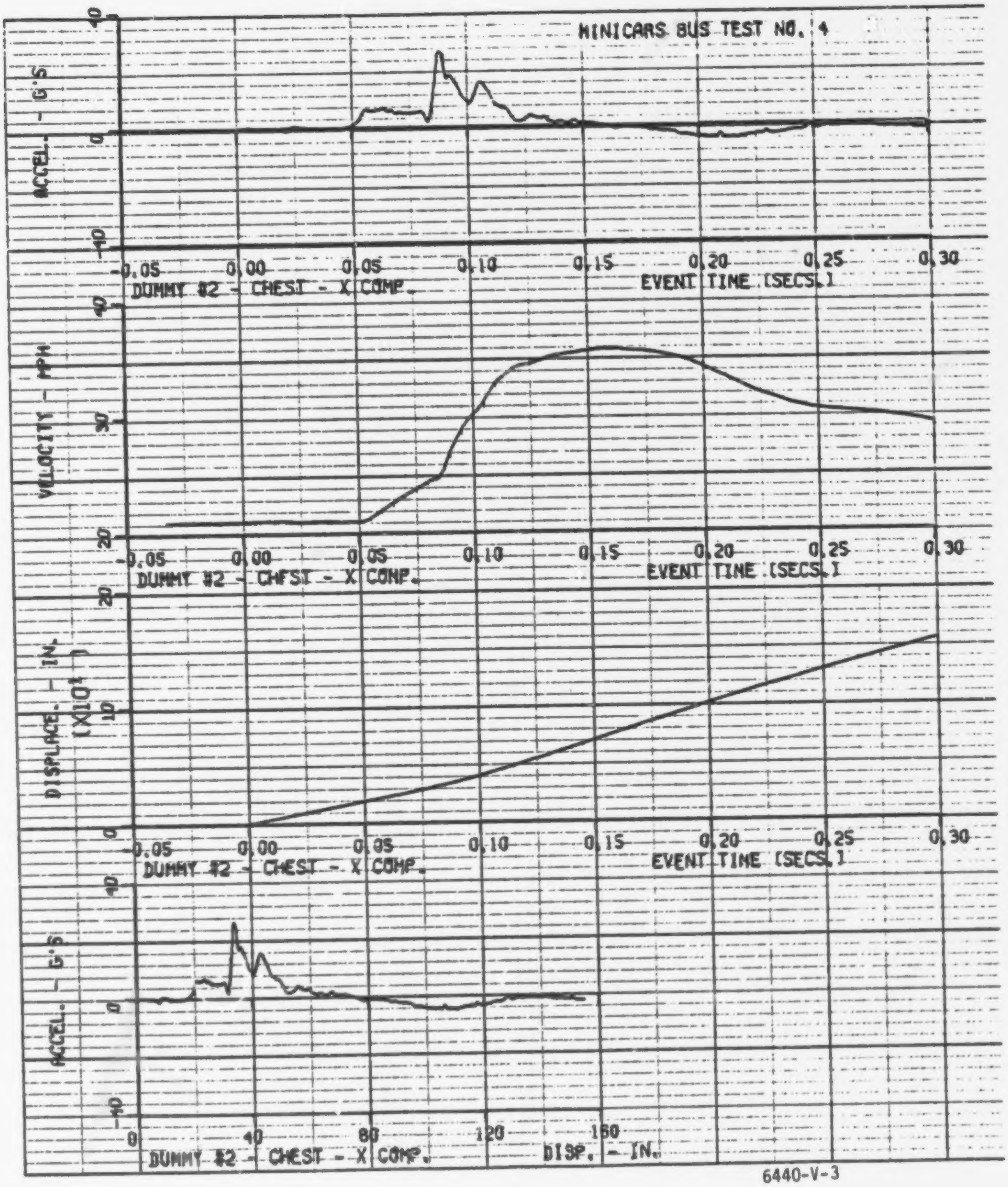
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S (X10¹)
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - HEAD - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S (X10¹)
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - HEAD - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S (X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - HEAD - Z COMP.
EVENT TIME (SECS.)

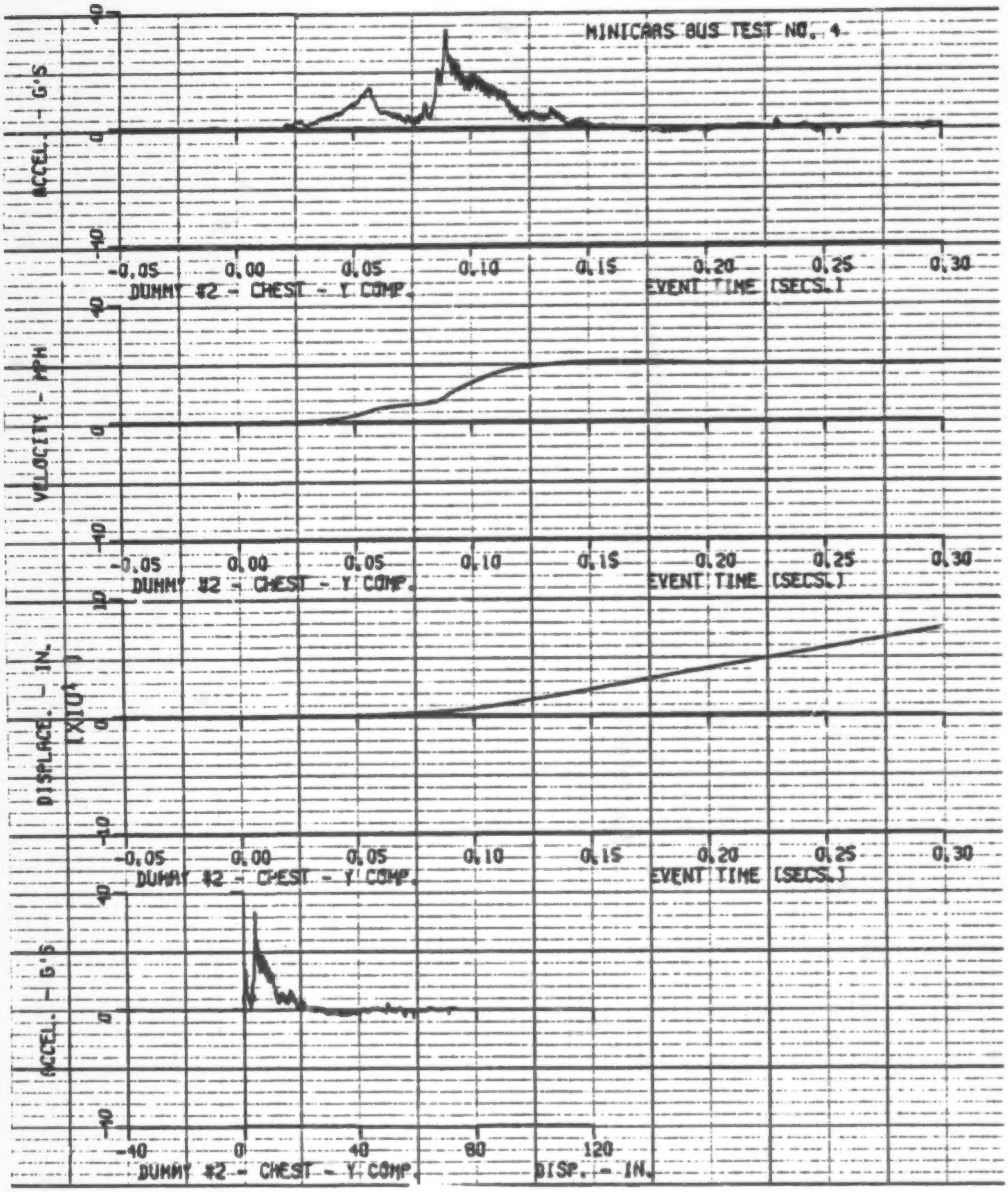
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
(X10¹)
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
(X10²)
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - HEAD A
EVENT TIME (SECS.)

6440-V-3

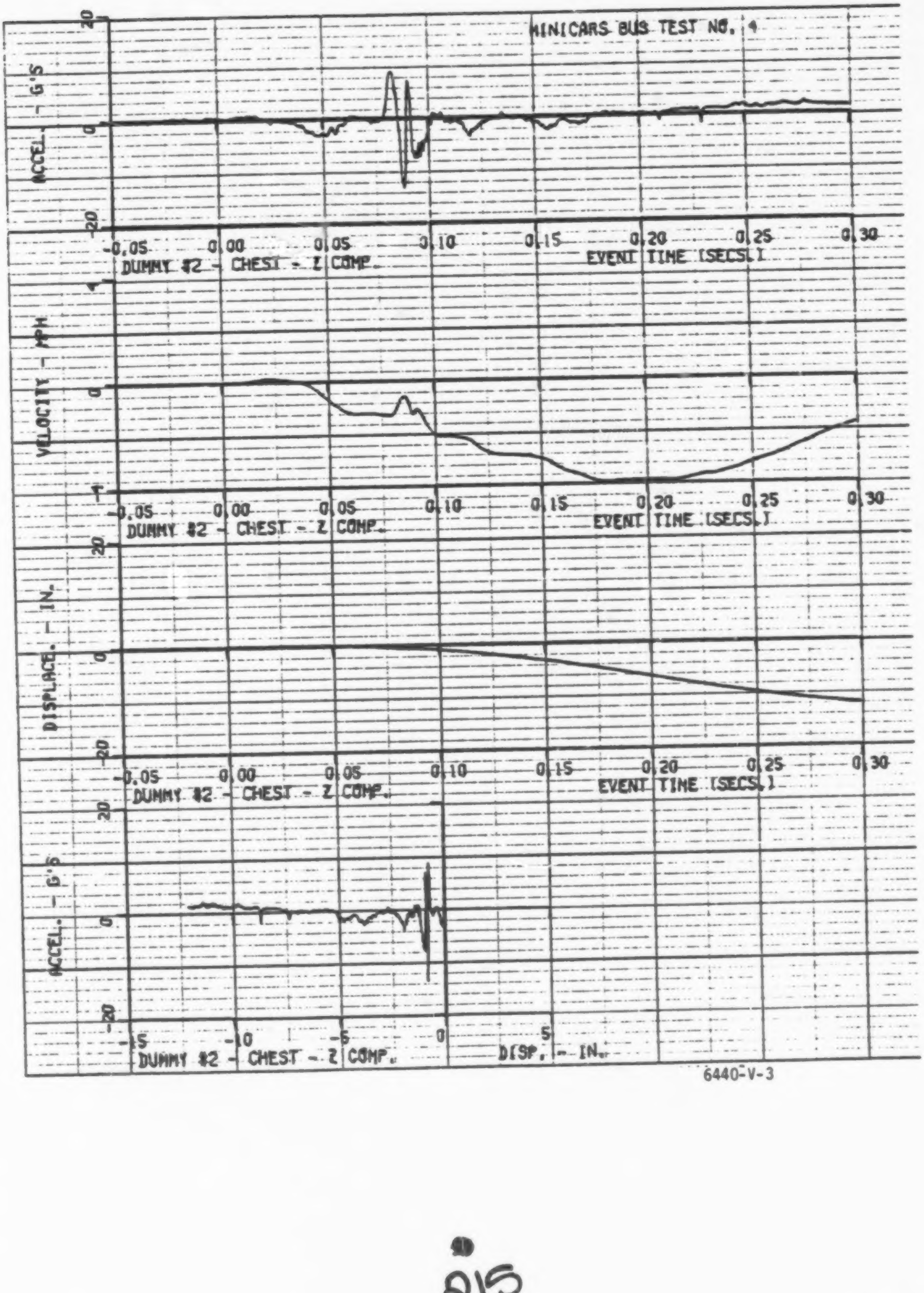

MINICARS BUS TEST NO. 4
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - X COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
40
30
20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - X COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
(X10¹)
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
0
40
80
120
160
DUMMY #2 - CHEST - X COMP.
DISP. - IN.

6440-V-3

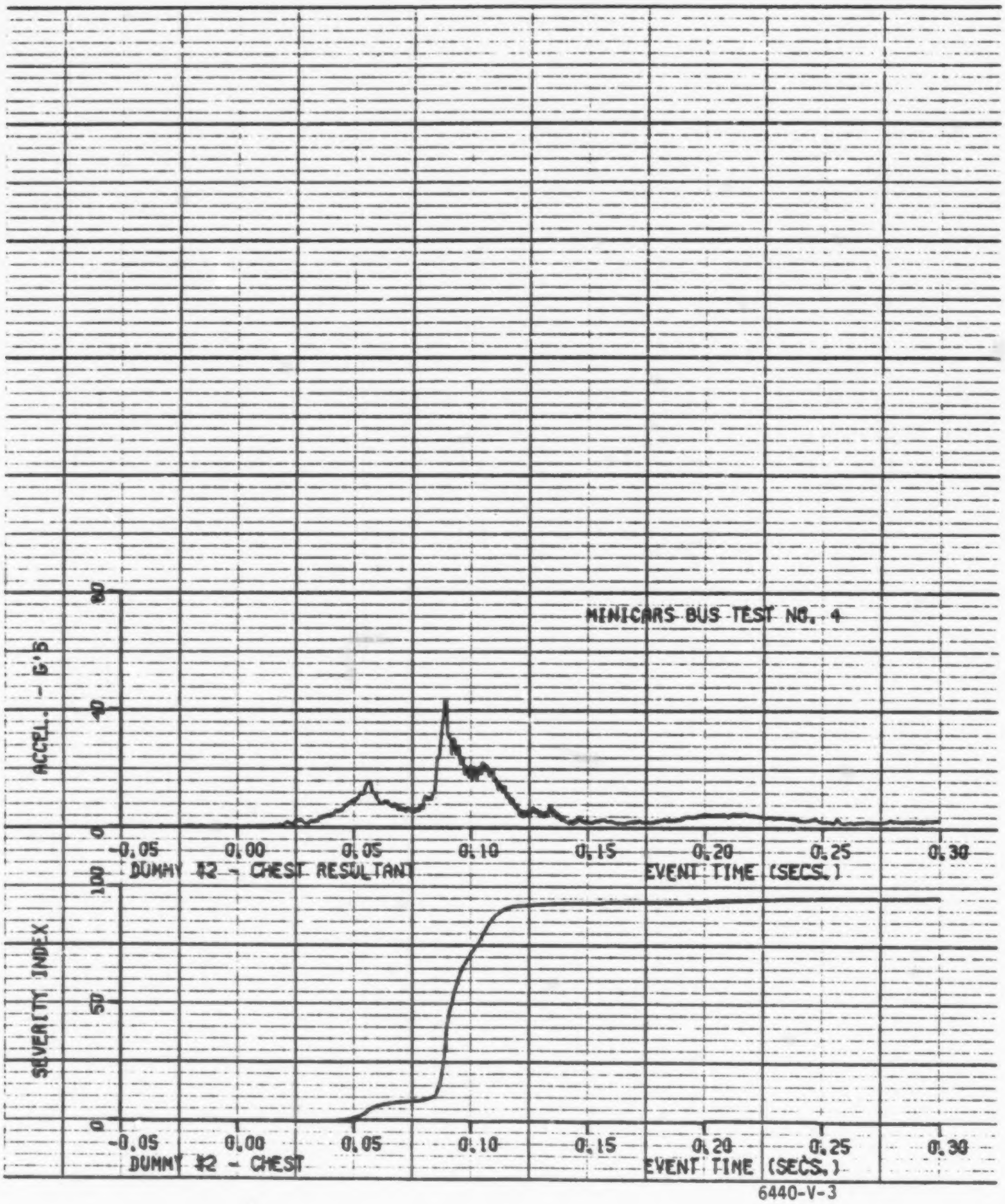

MINICARS BUS TEST NO. 4
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - Y COMP.
EVENT TIME [SECS.]
VELOCITY - MPH
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - Y COMP.
EVENT TIME [SECS.]
DISPLACE. - IN.
[X10^1]
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - Y COMP.
EVENT TIME [SECS.]
ACCEL. - G'S
40
0
-40
-40
0
40
80
120
DUMMY #2 - CHEST - Y COMP.
DISP. - IN.

6440-V-3

014

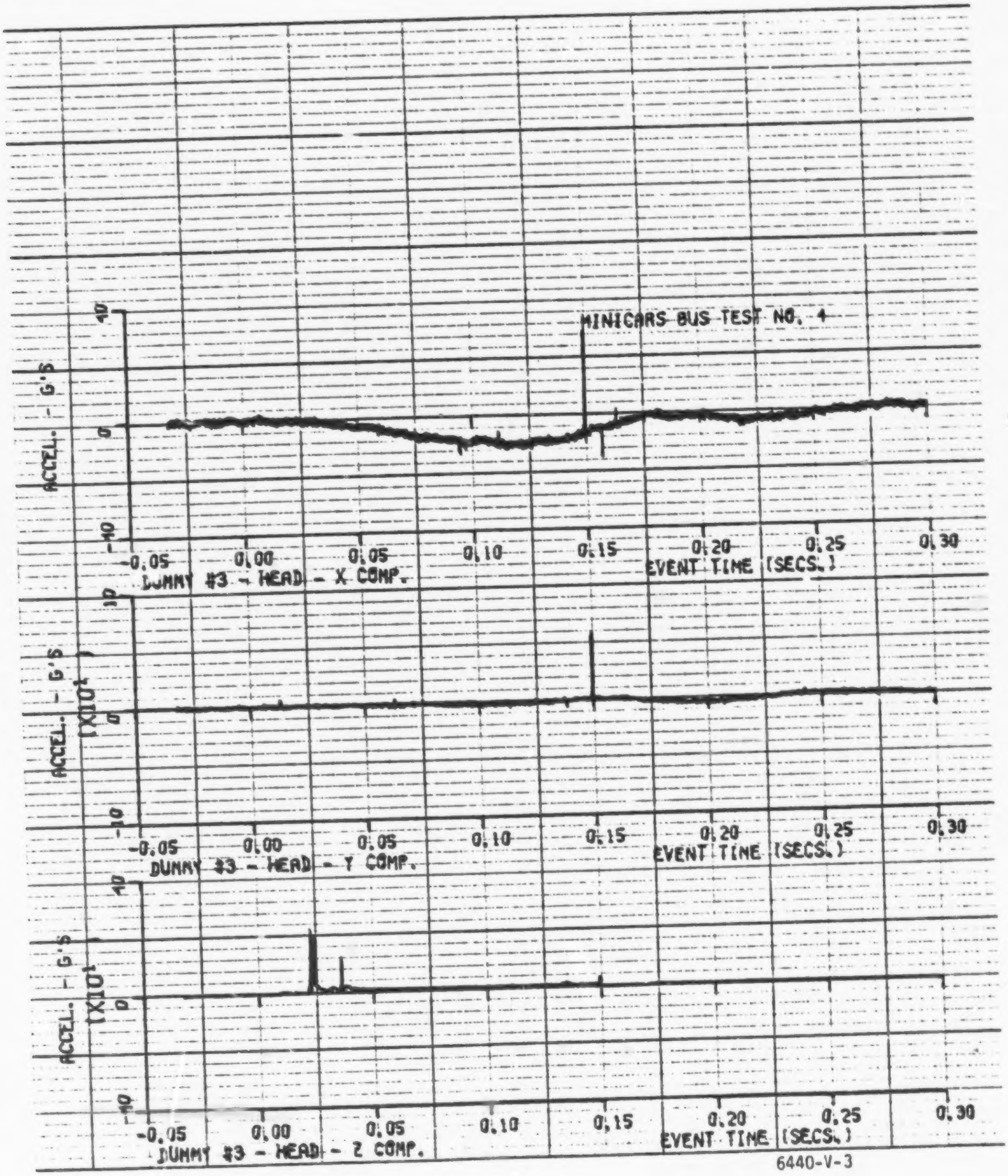

MINICARS BUS TEST NO. 4
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
DUMMY #2 - CHEST - Z COMP.
VELOCITY - MPH
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
DUMMY #2 - CHEST - Z COMP.
DISPLACE. - IN.
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
DUMMY #2 - CHEST - Z COMP.
ACCEL. - G'S
20
0
-20
-15
-10
-5
0
5
DUMMY #2 - CHEST - Z COMP.
DISP. - IN.

6440-V-3

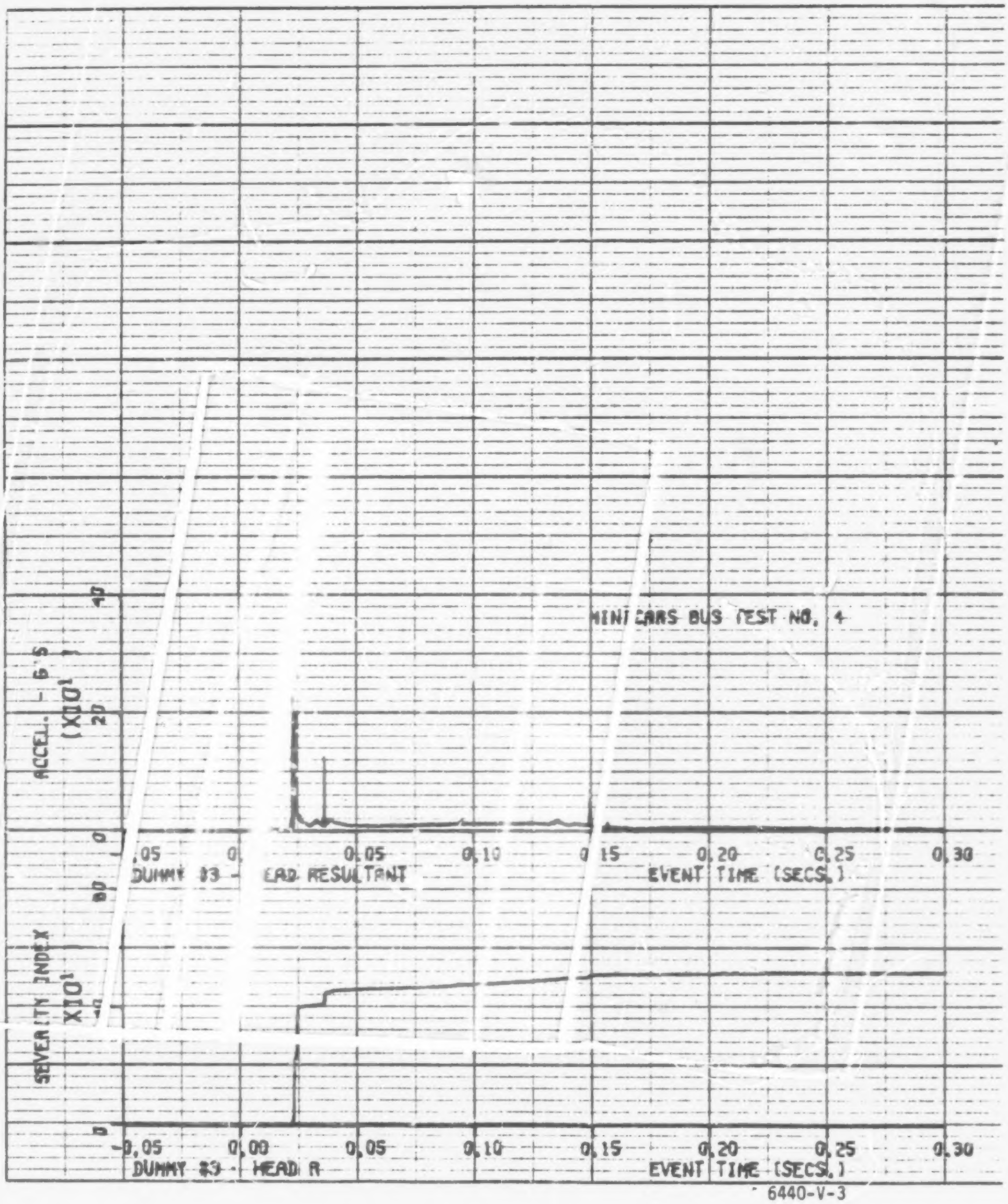

MINICARS BUS TEST NO. 4
ACCEL. - G'S
80
40
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
100
50
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST
EVENT TIME (SECS.)

6440-V-3

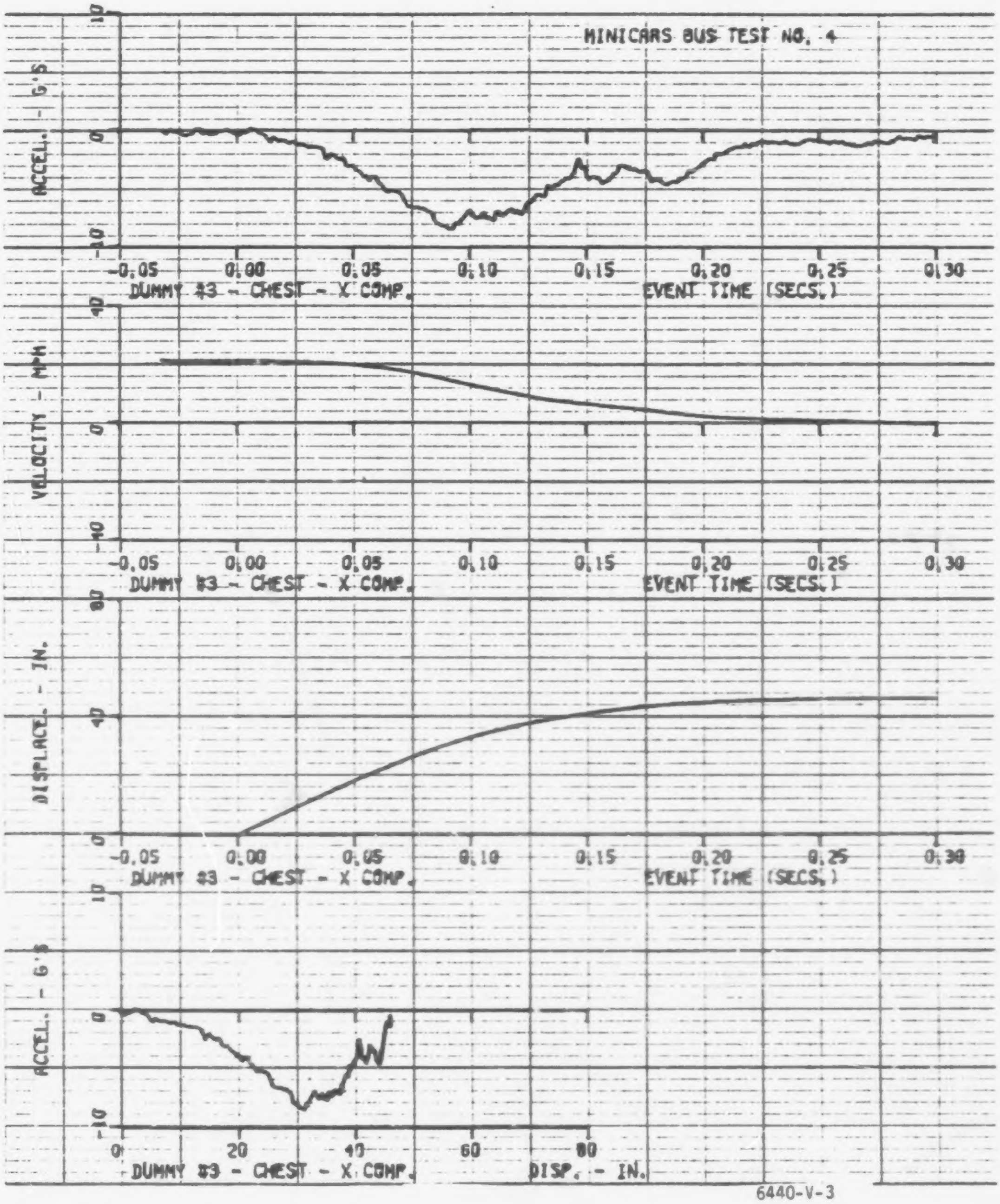
Q16


MINICARS BUS TEST NO. 4
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
DUMMY #3 - HEAD - X COMP.
ACCEL. - G'S (X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
DUMMY #3 - HEAD - Y COMP.
ACCEL. - G'S (X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
DUMMY #3 - HEAD - Z COMP.

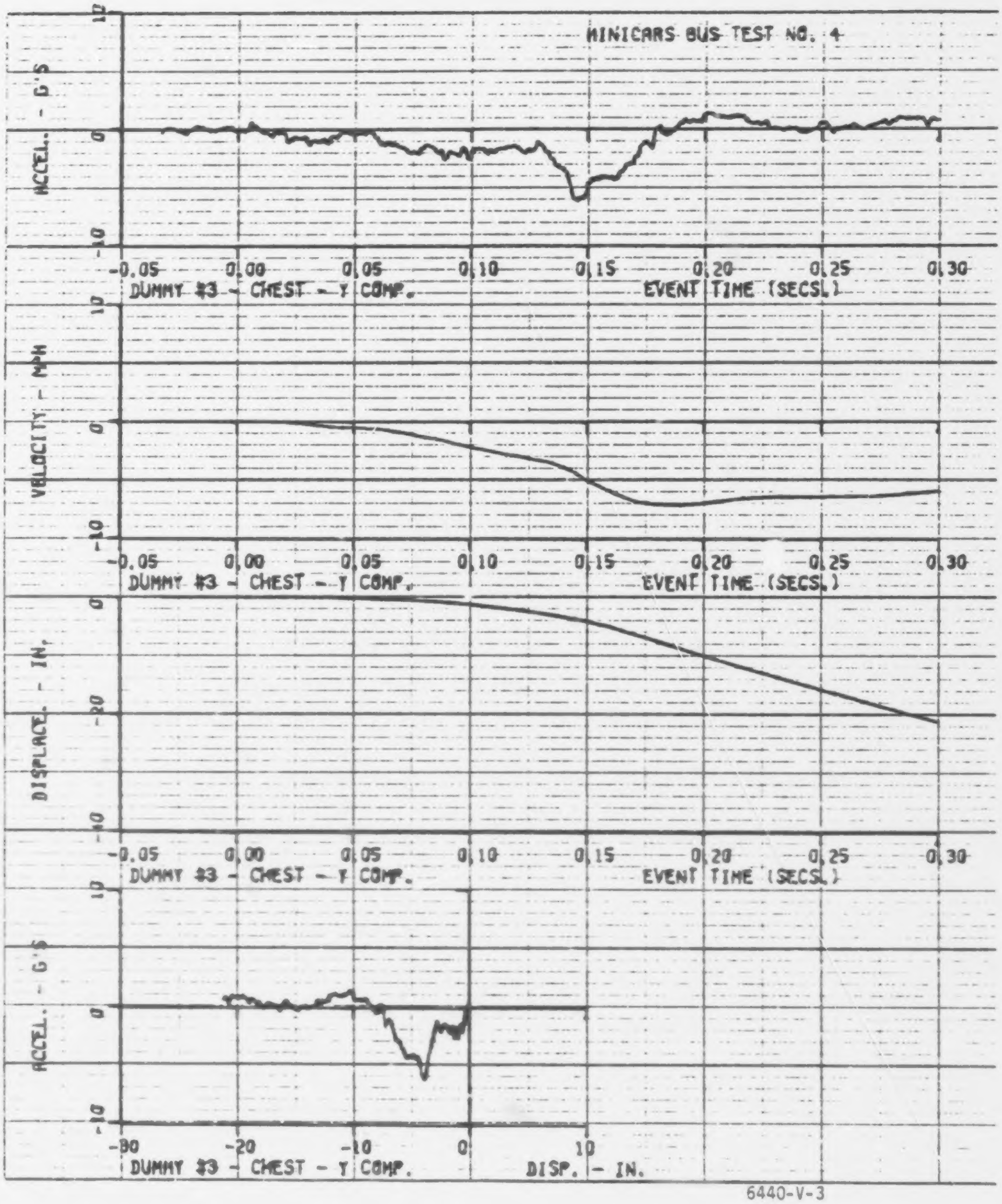
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
(X10¹)
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
X10¹
80
40
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - HEAD R
EVENT TIME (SECS.)

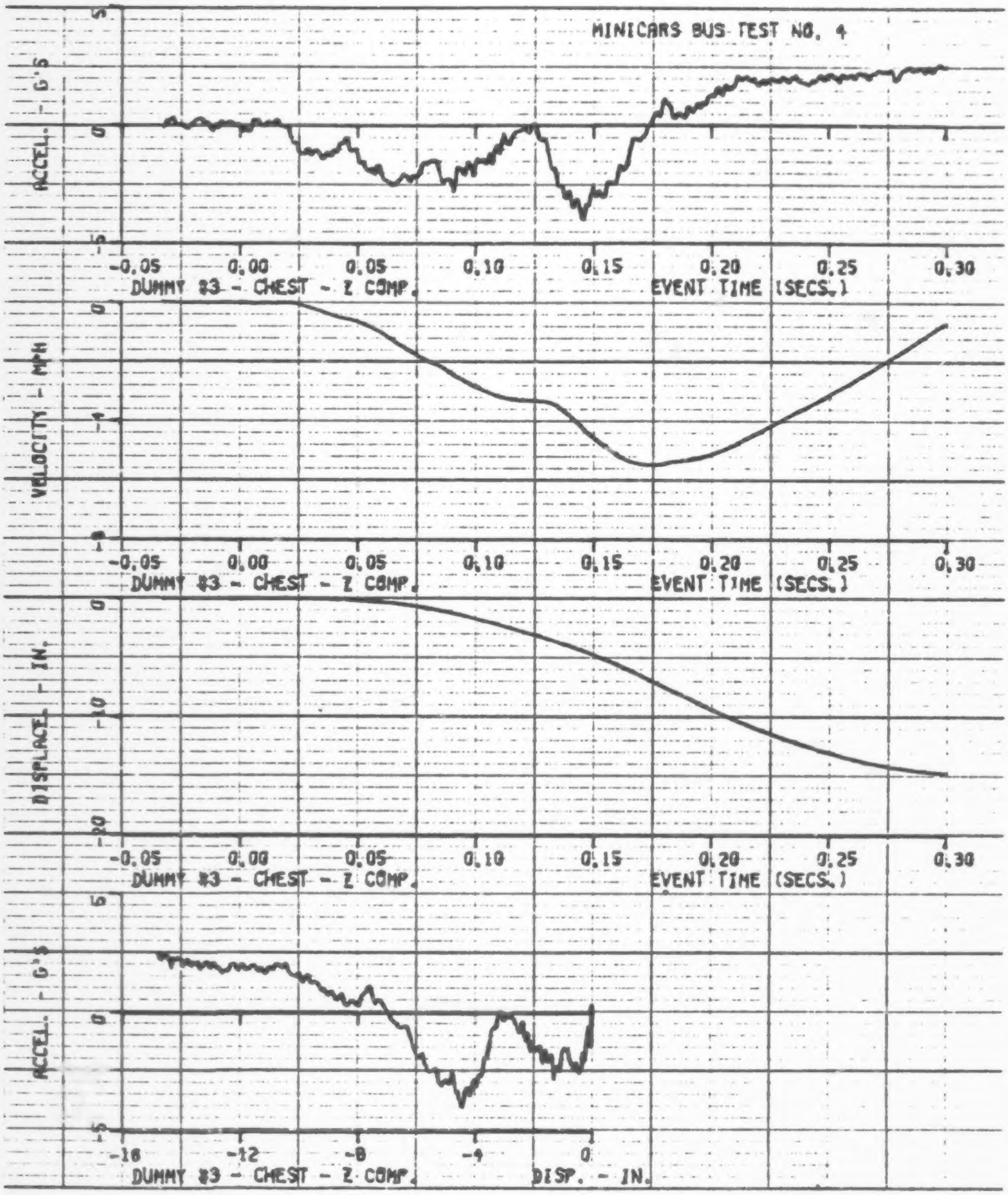
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - X COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - X COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
80
40
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
0
20
40
60
80
DUMMY #3 - CHEST - X COMP.
DISP. - IN.

6440-V-3

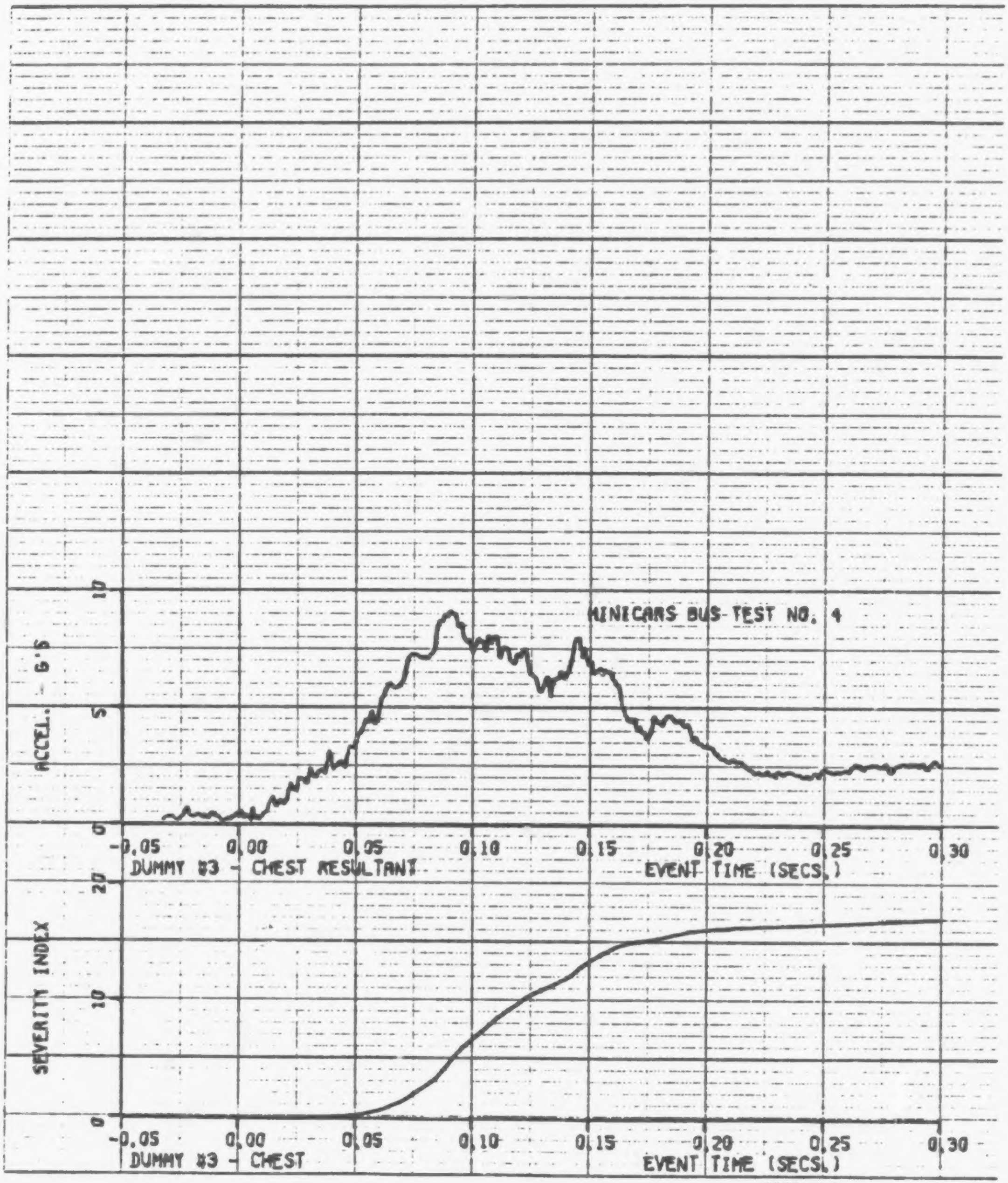

MINICARS BUS TEST NO. 4
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - Y COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - Y COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-20
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-30
-20
-10
0
10
DUMMY #3 - CHEST - Y COMP.
DISP. - IN.

6440-V-3

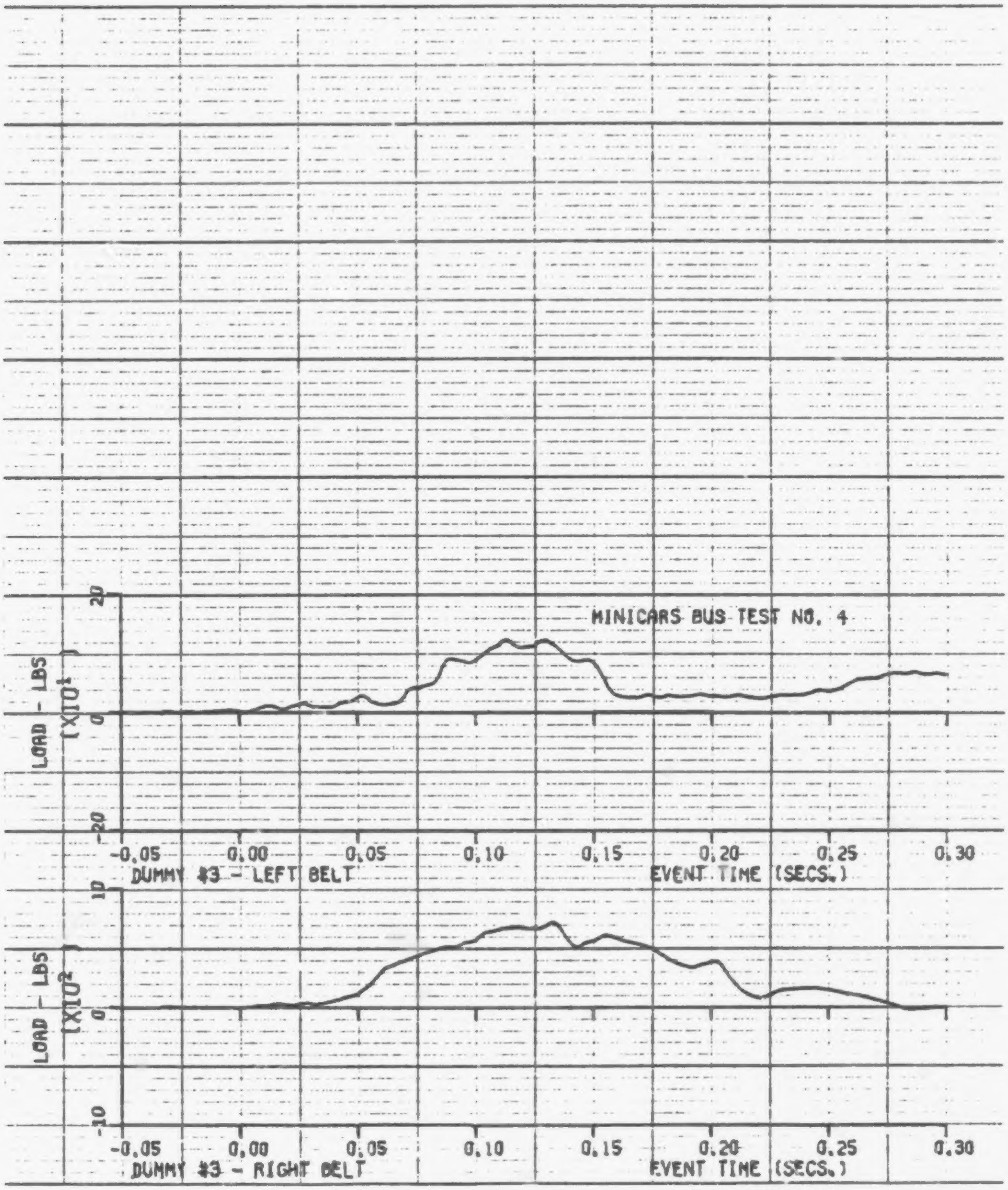

MINICARS BUS TEST NO. 4
ACCEL. - G'S
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - Z COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
0
-4
-8
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - Z COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-10
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - Z COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
5
0
-5
-16
-12
-8
-4
0
DUMMY #3 - CHEST - Z COMP.
DISP. - IN.

6440-V-3

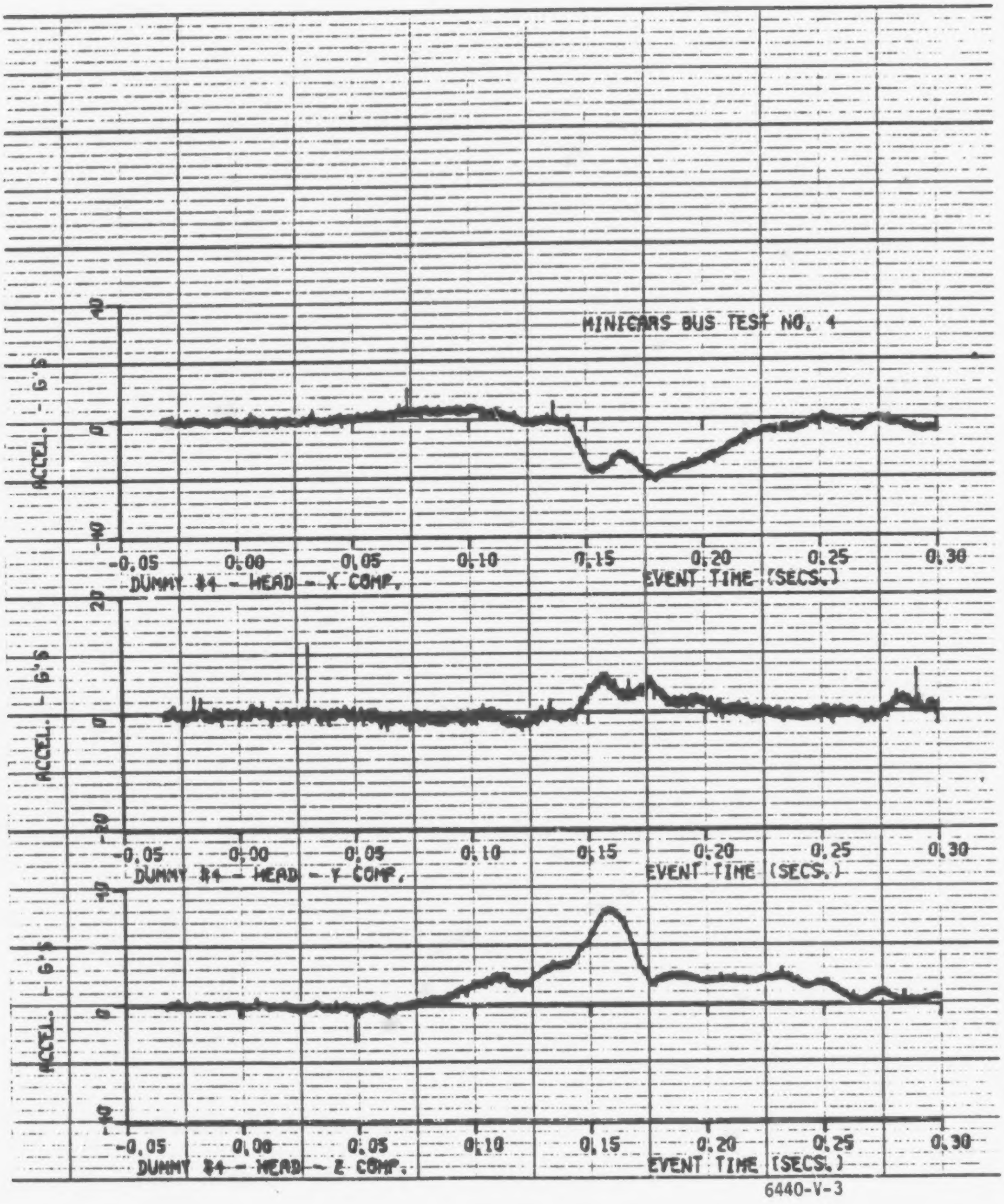
221


MINICARS BUS TEST NO. 4
ACCEL. - G'S
0
5
10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
0
10
20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST
EVENT TIME (SECS.)

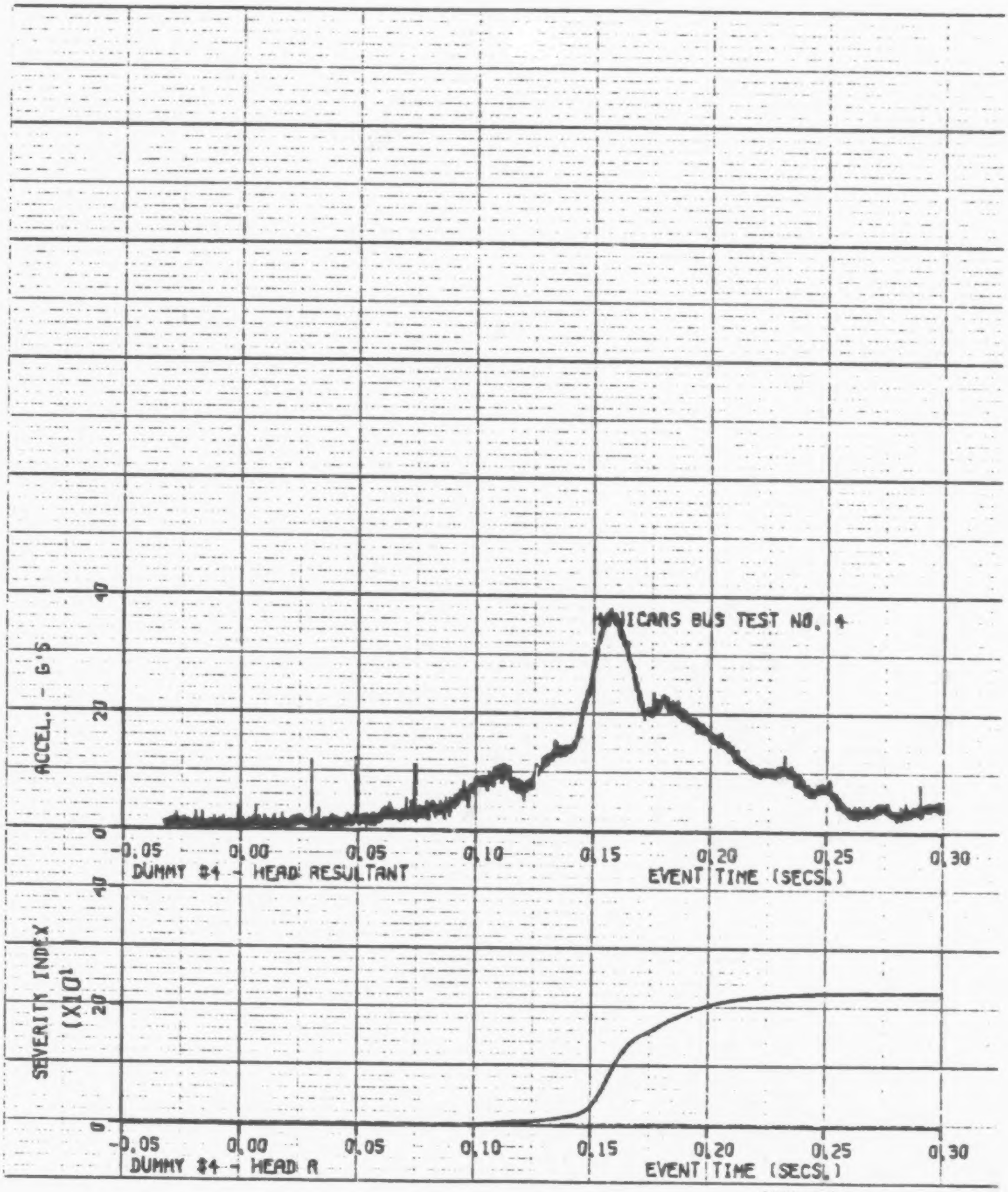
6440-V-3


MINICARS BUS TEST NO. 4
LOAD - LBS
(X10¹)
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - LEFT BELT
EVENT TIME (SECS.)
LOAD - LBS
(X10²
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - RIGHT BELT
EVENT TIME (SECS.)

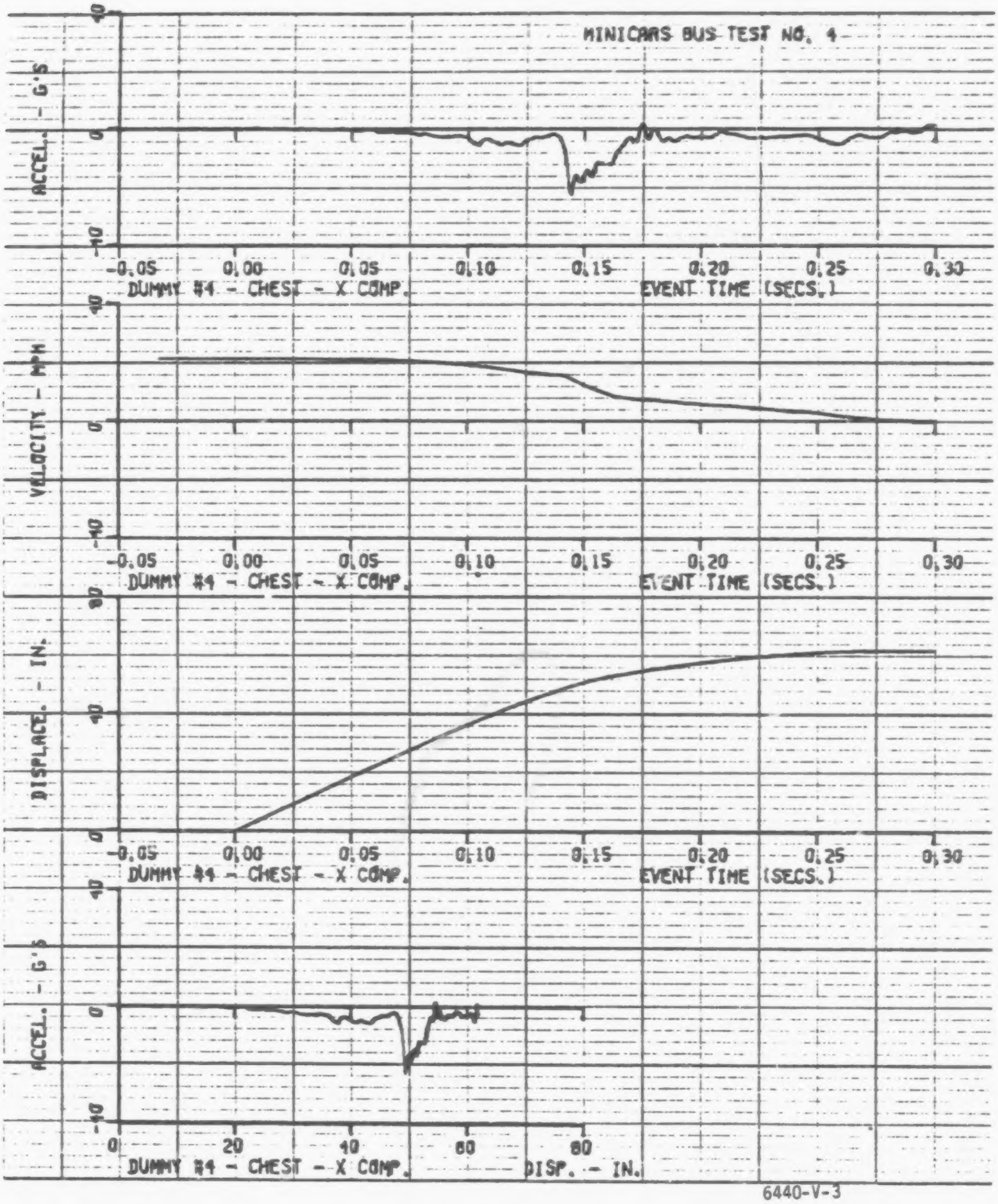
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - HEAD - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - HEAD - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - HEAD - Z COMP.
EVENT TIME (SECS.)

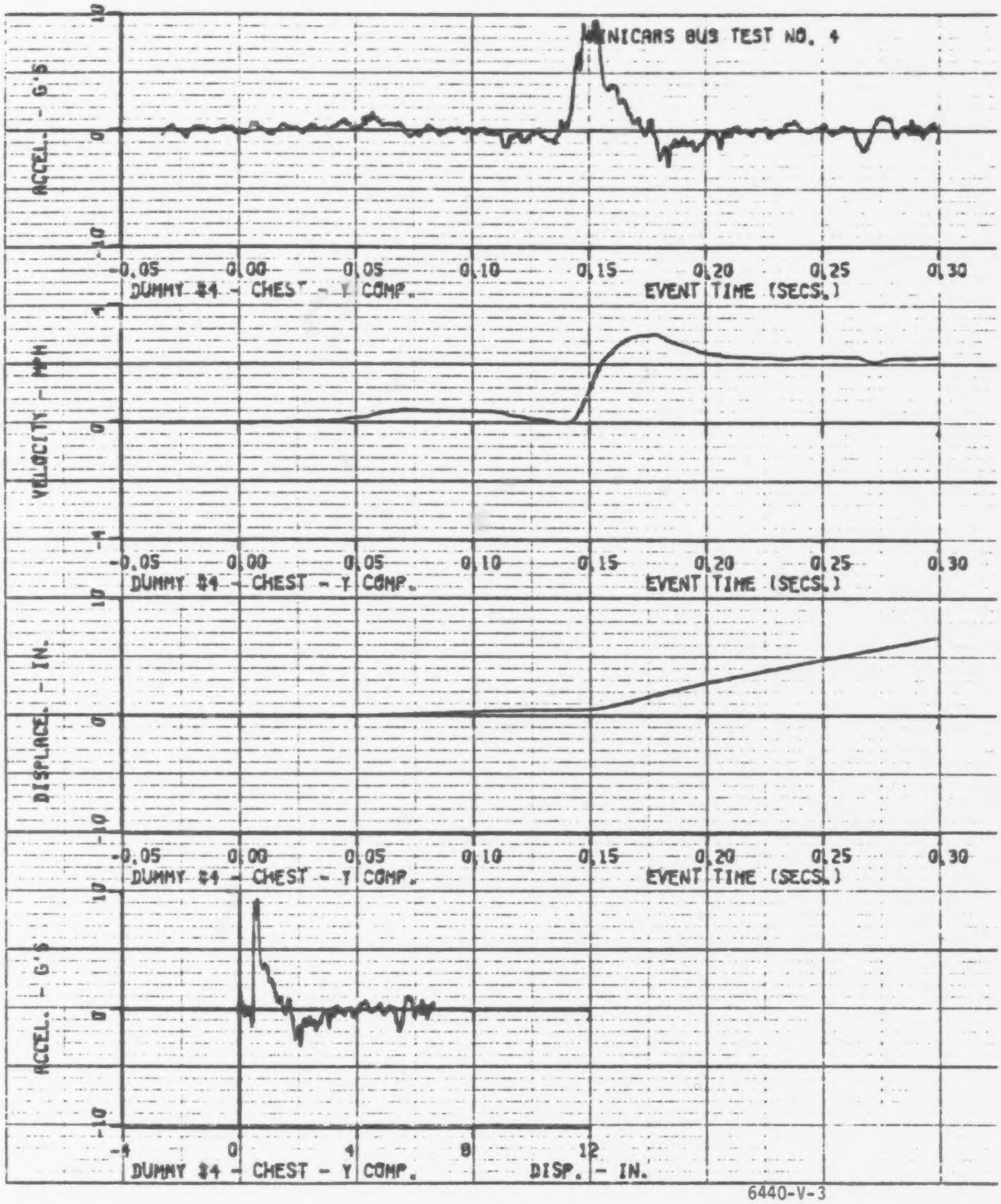
6440-V-3


ICARS BUS TEST NO. 4
ACCEL. - G'S
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
(X10^1)
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - HEAD R
EVENT TIME (SECS.)

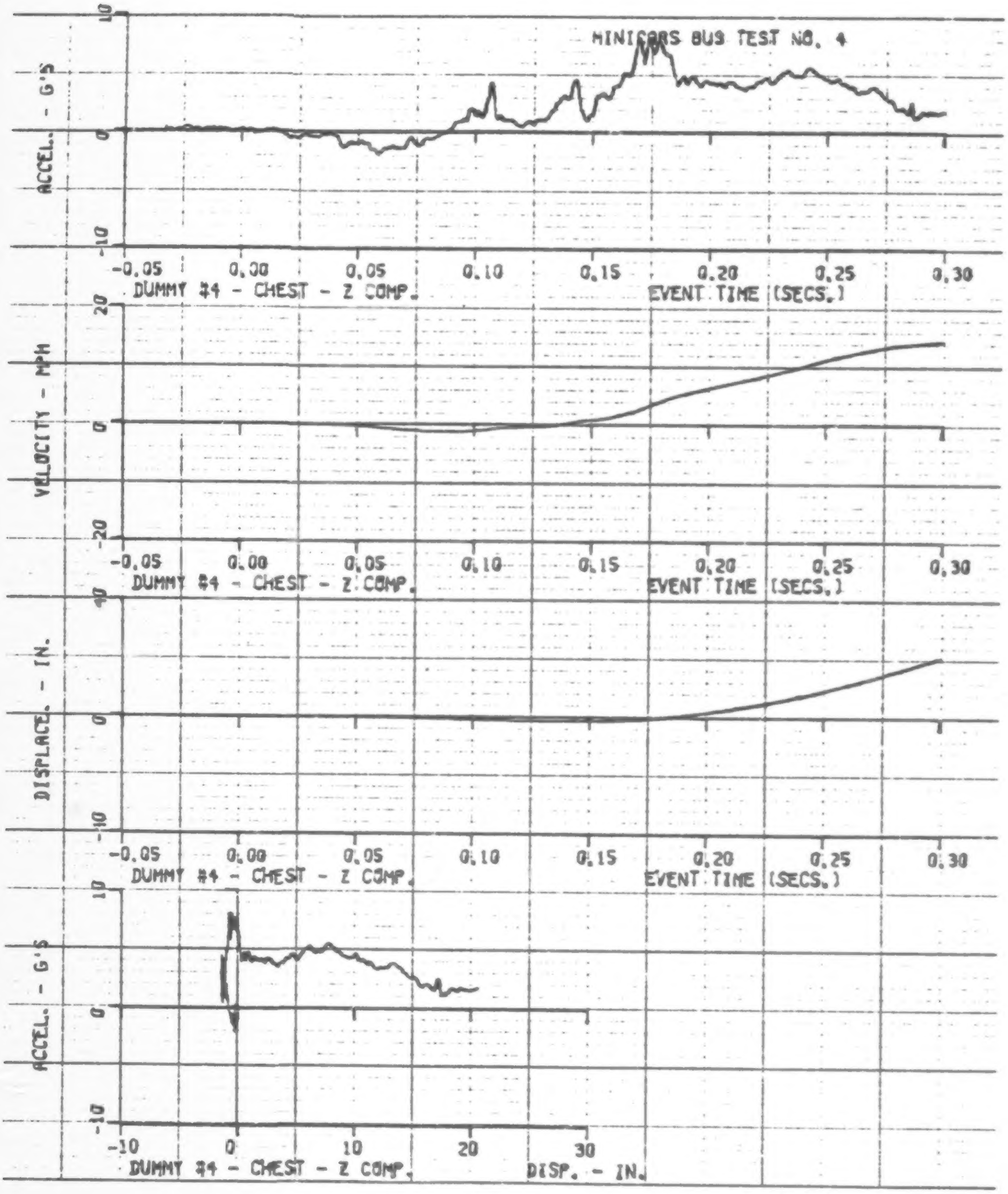
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - X COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - X COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
80
40
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
0
20
40
60
80
DUMMY #4 - CHEST - X COMP.
DISP. - IN.

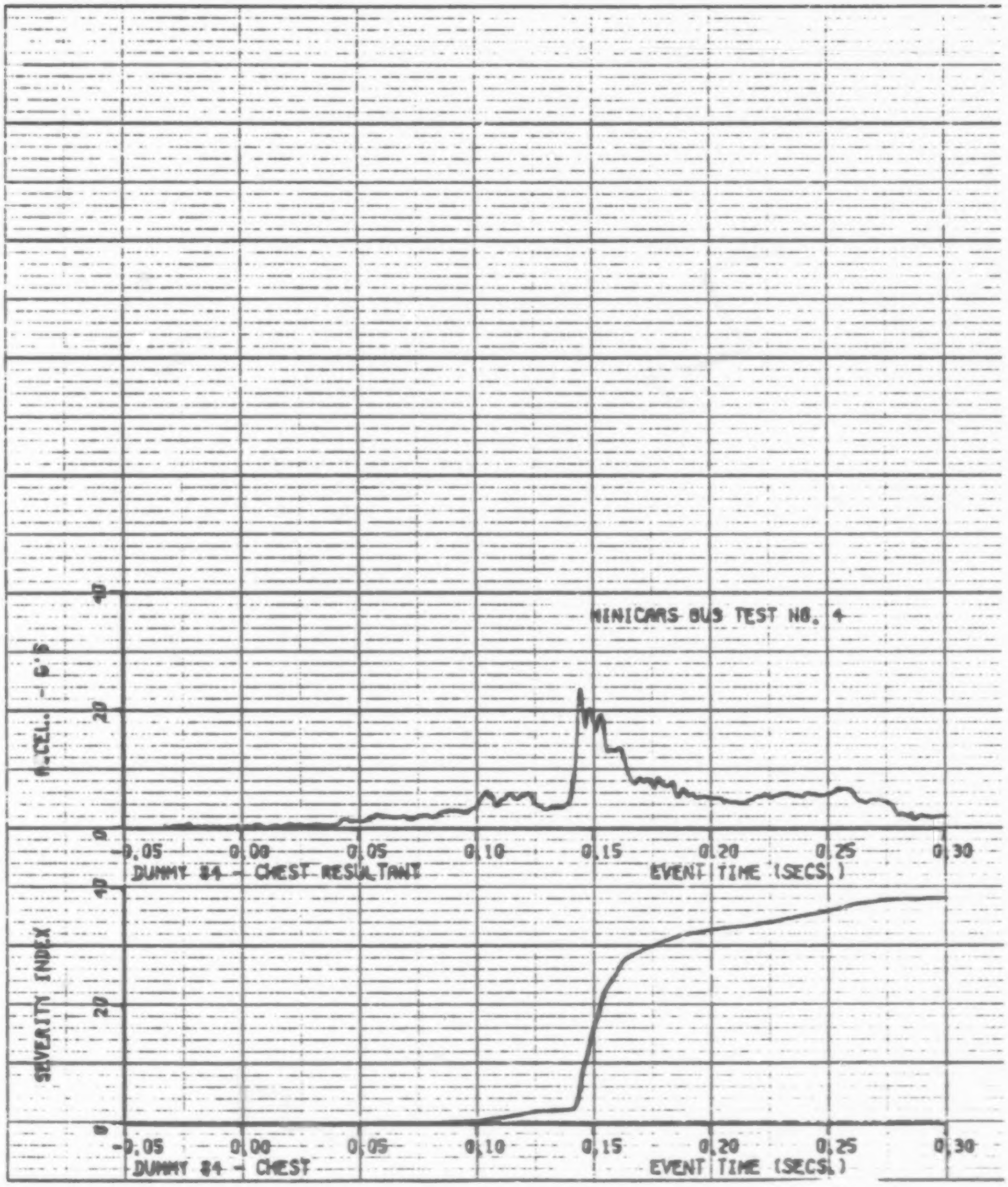
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Y COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Y COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-4
0
4
8
12
DUMMY #4 - CHEST - Y COMP.
DISP. - IN.

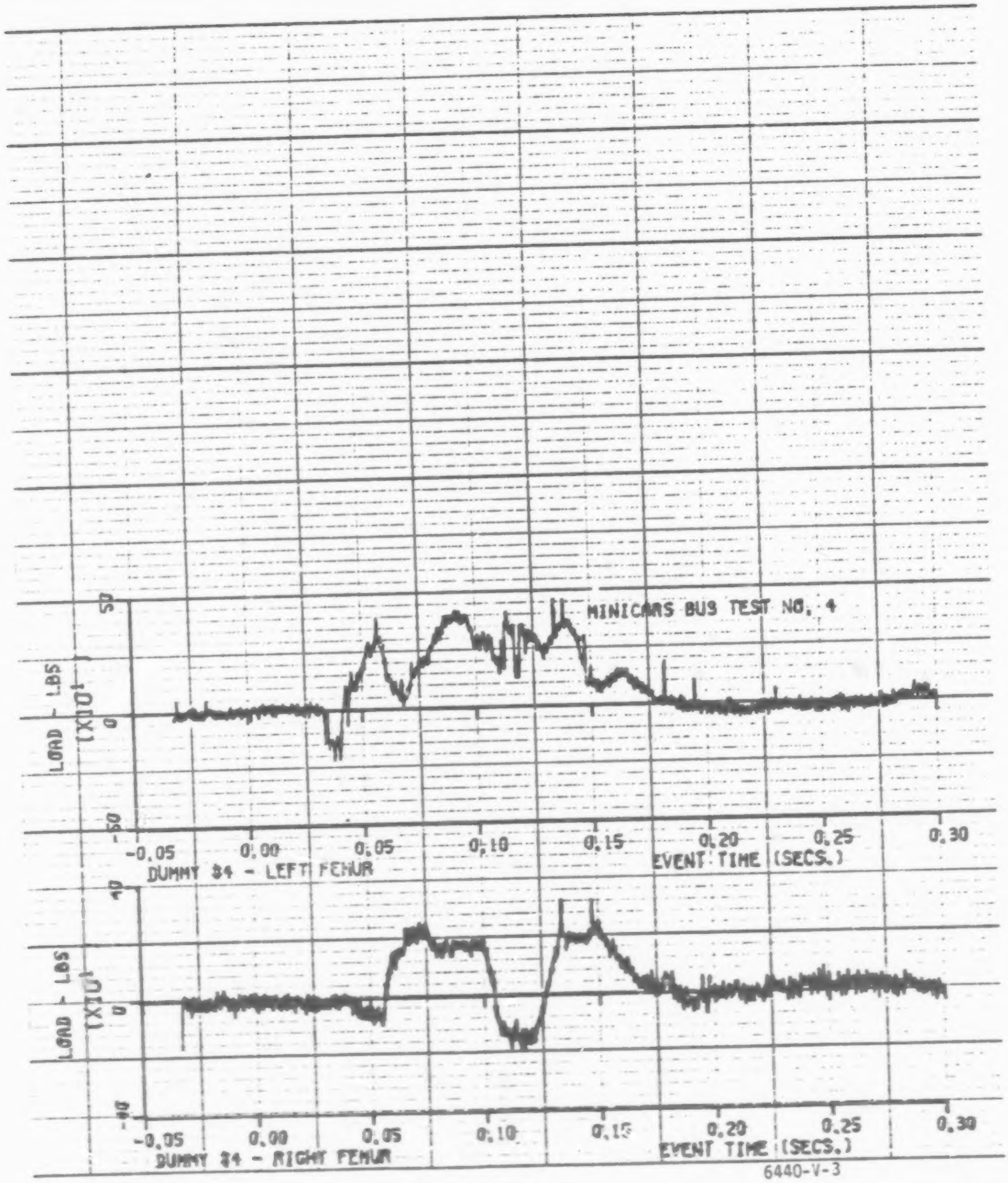
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Z COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Z COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Z COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-10
0
10
20
30
DUMMY #4 - CHEST - Z COMP.
DISP. - IN.

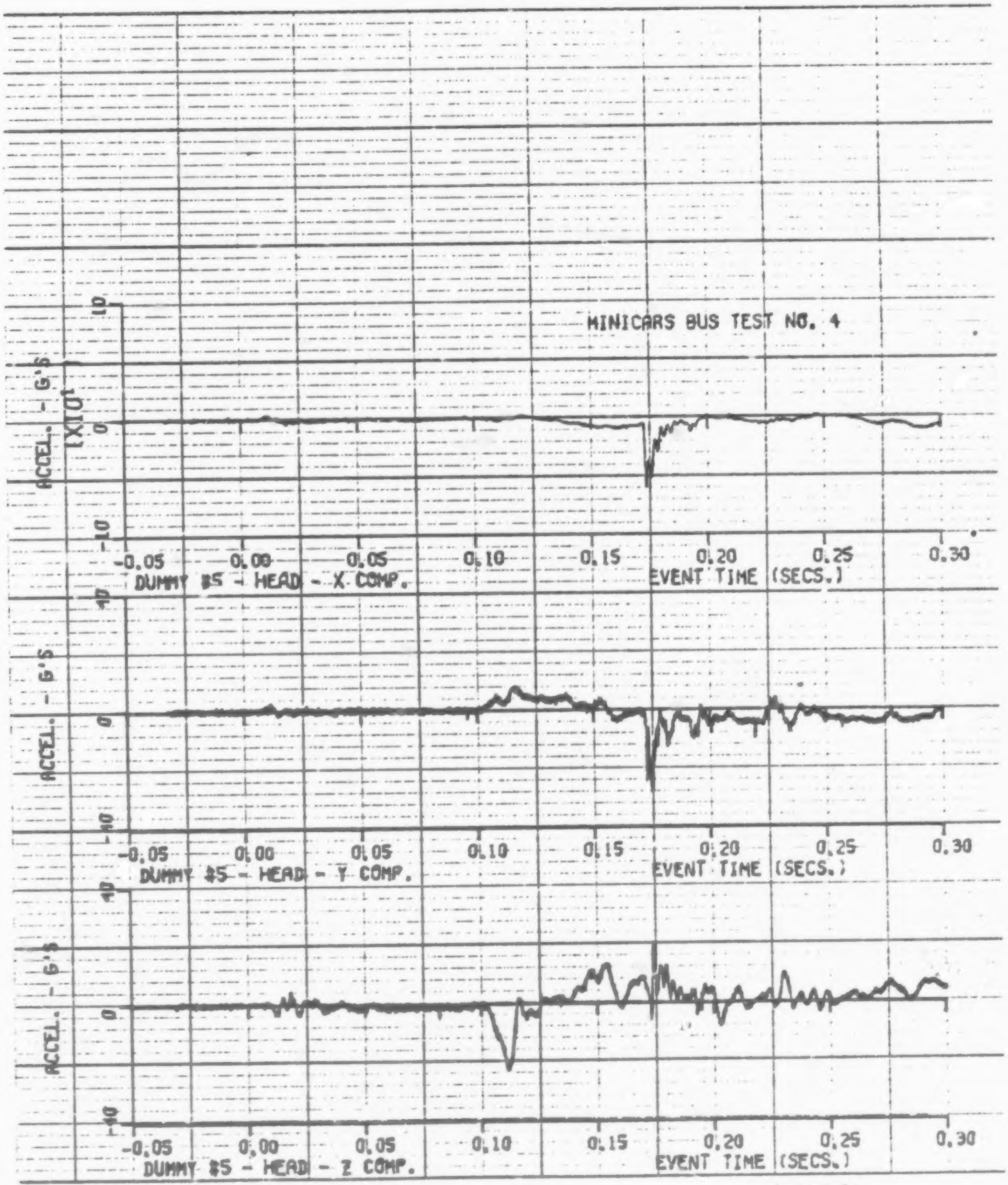
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST
EVENT TIME (SECS.)

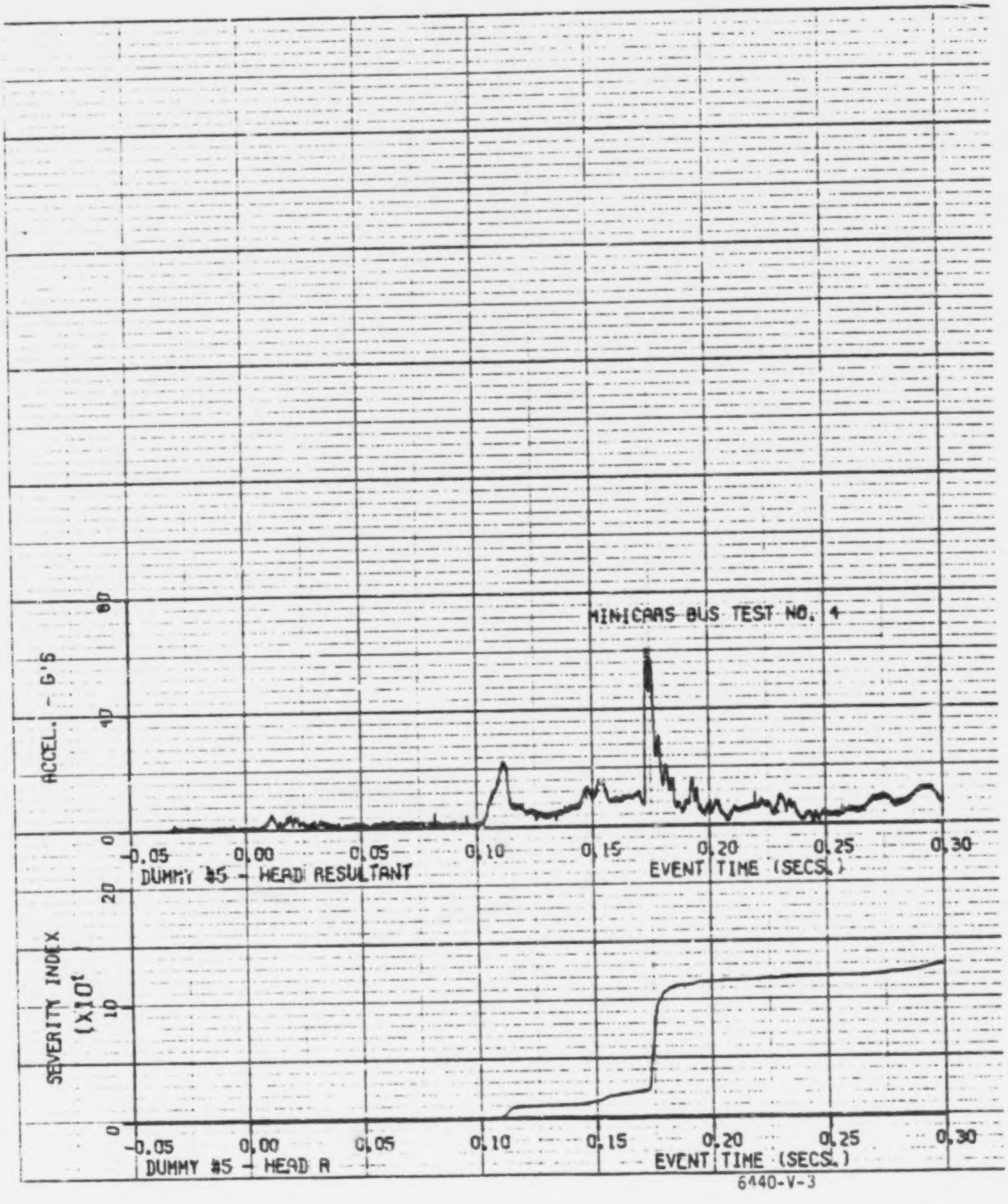
6440-V-3


MINICARS BUS TEST NO. 4
LOAD - LBS (X10¹)
50
0
-50
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - LEFT FEMUR
EVENT TIME (SECS.)
LOAD - LBS (X10¹)
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - RIGHT FEMUR
EVENT TIME (SECS.)

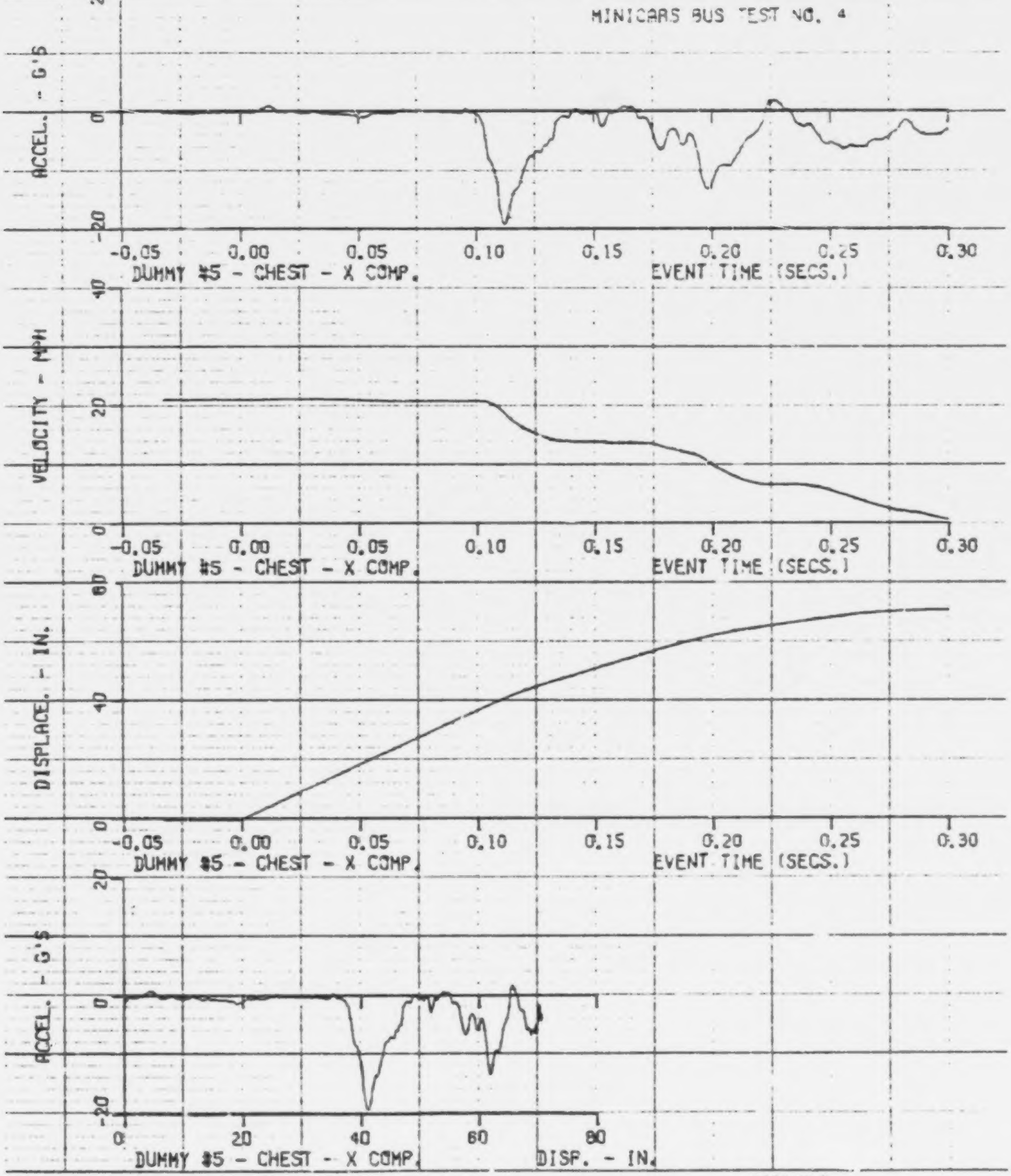
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S (X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - HEAD - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - HEAD - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - HEAD - Z COMP.
EVENT TIME (SECS.)

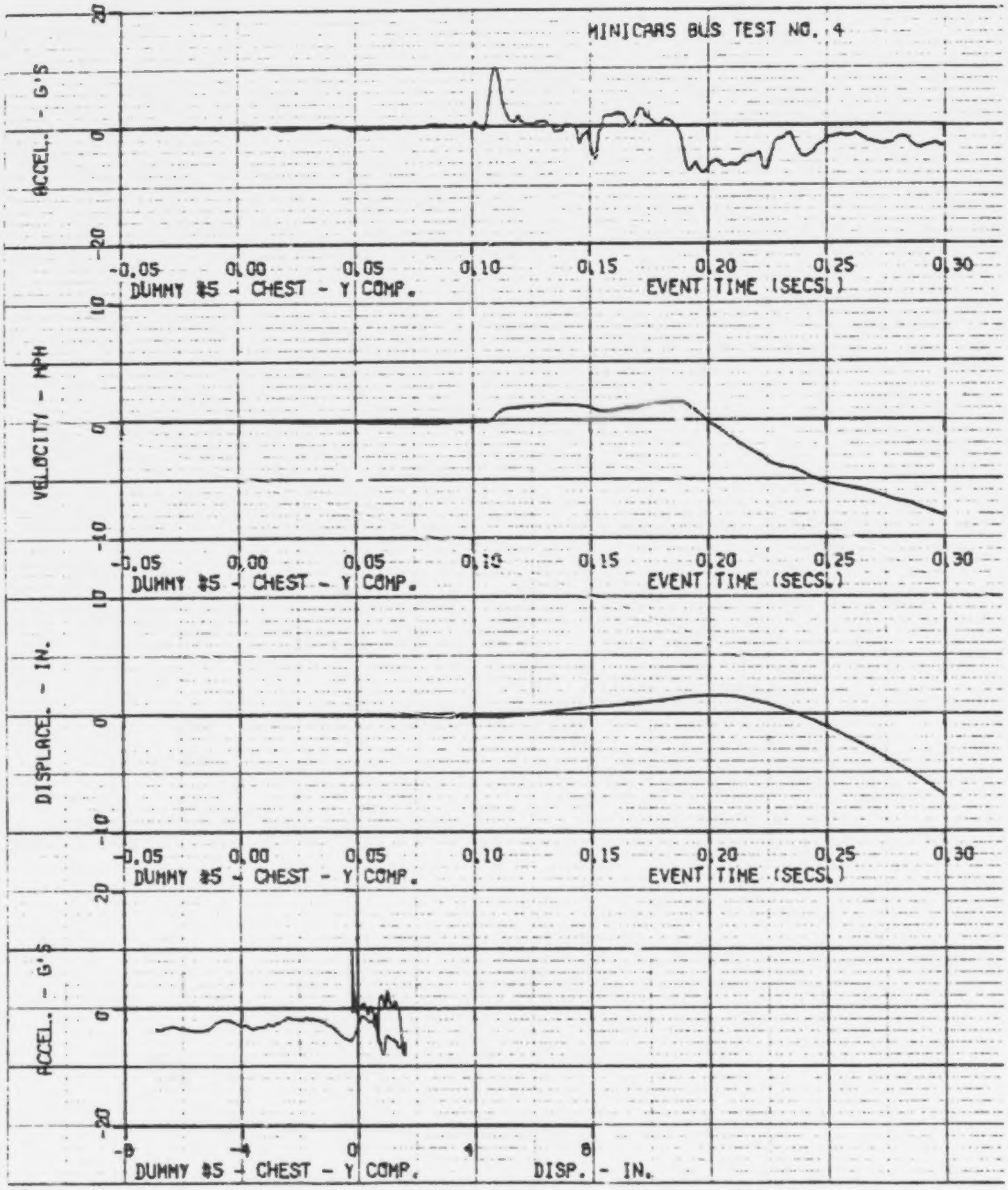
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
80
40
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
(X10¹)
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - HEAD A
EVENT TIME (SECS.)

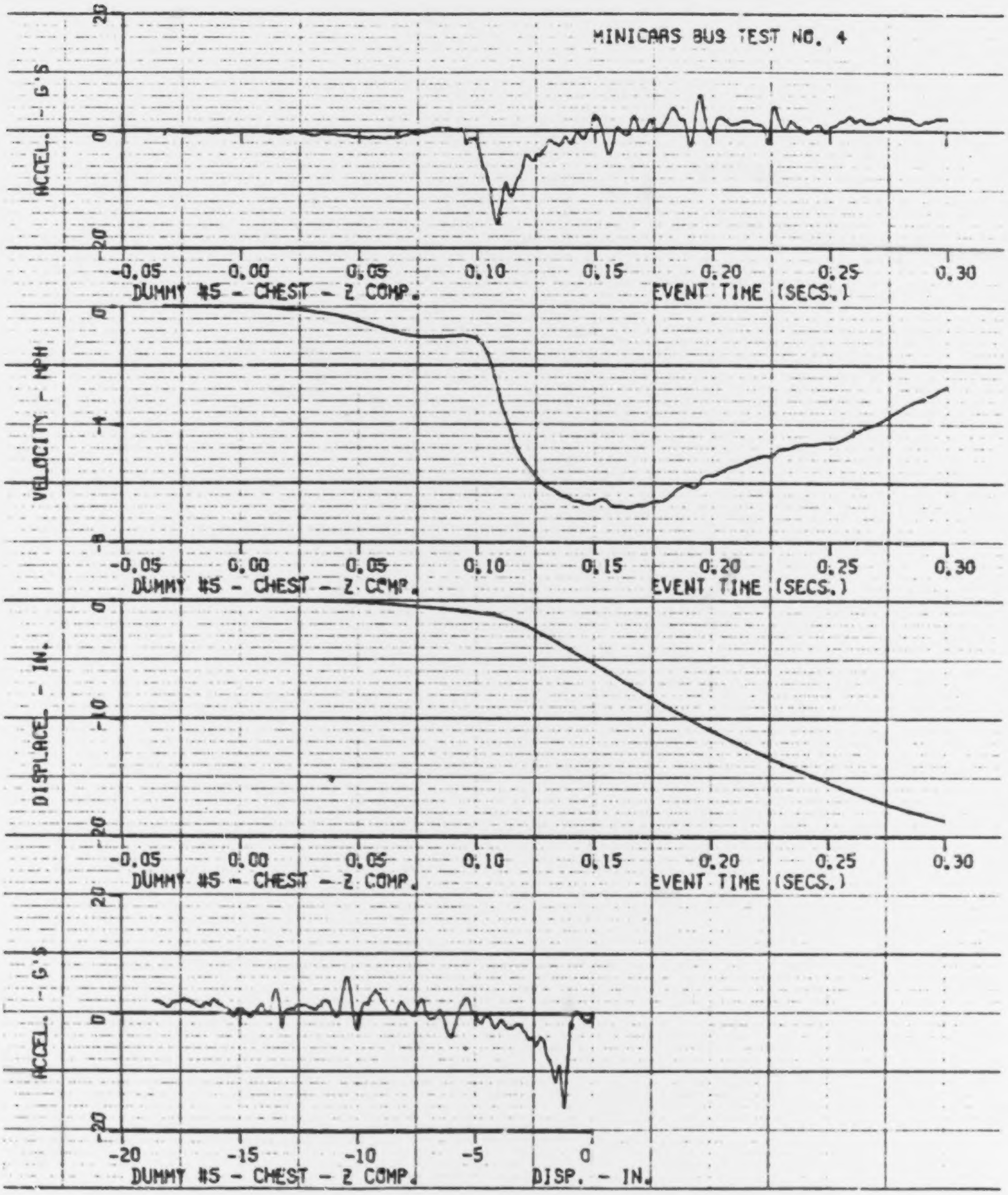
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - X COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - X COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
80
40
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
0
20
40
60
80
DUMMY #5 - CHEST - X COMP.
DISP. - IN.

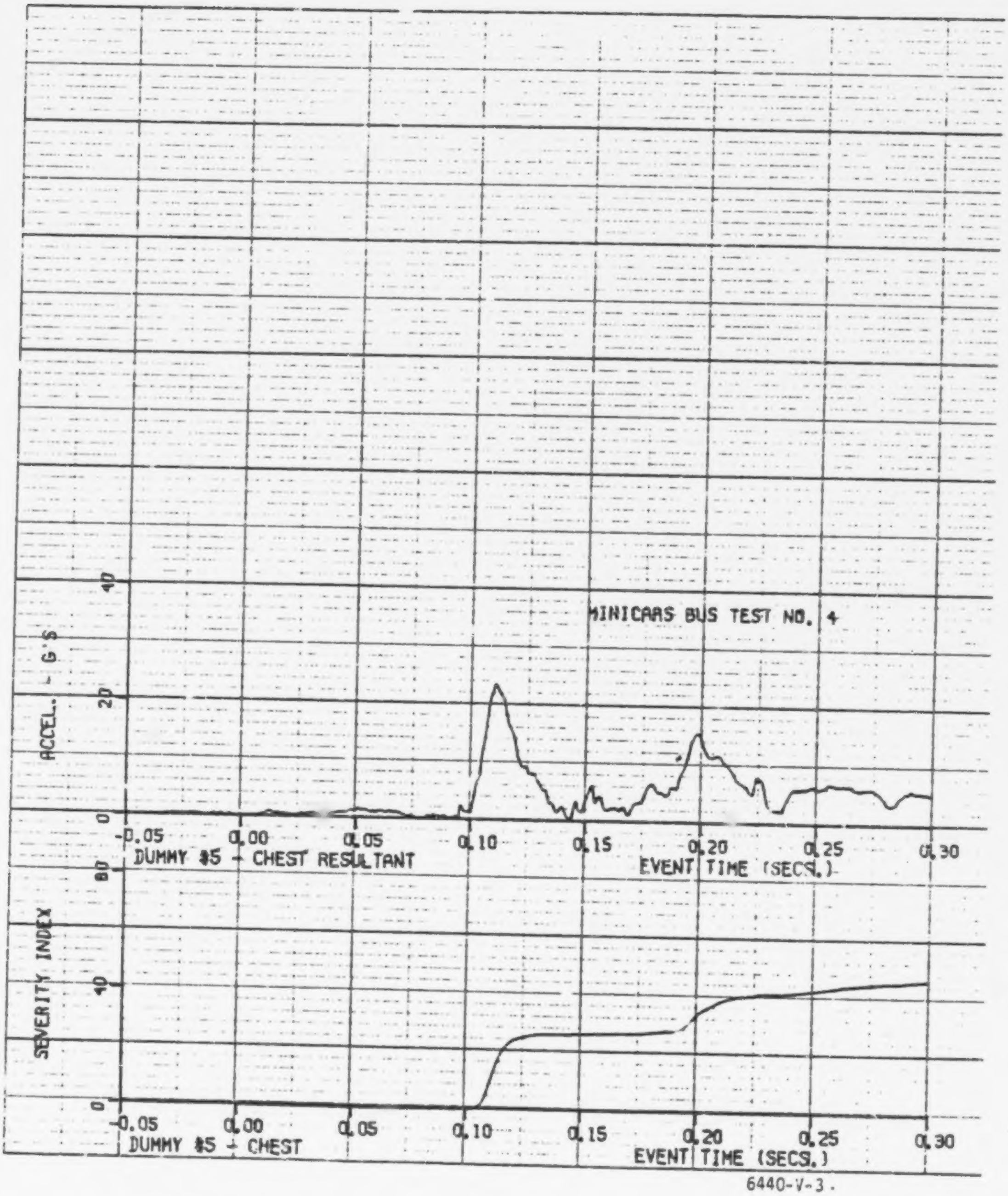
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Y COMP.
EVENT TIME (SECS)
VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Y COMP.
EVENT TIME (SECS)
DISPLACE. - IN.
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Y COMP.
EVENT TIME (SECS)
ACCEL. - G'S
20
0
-20
-8
-4
0
4
8
DUMMY #5 - CHEST - Y COMP.
DISP. - IN.

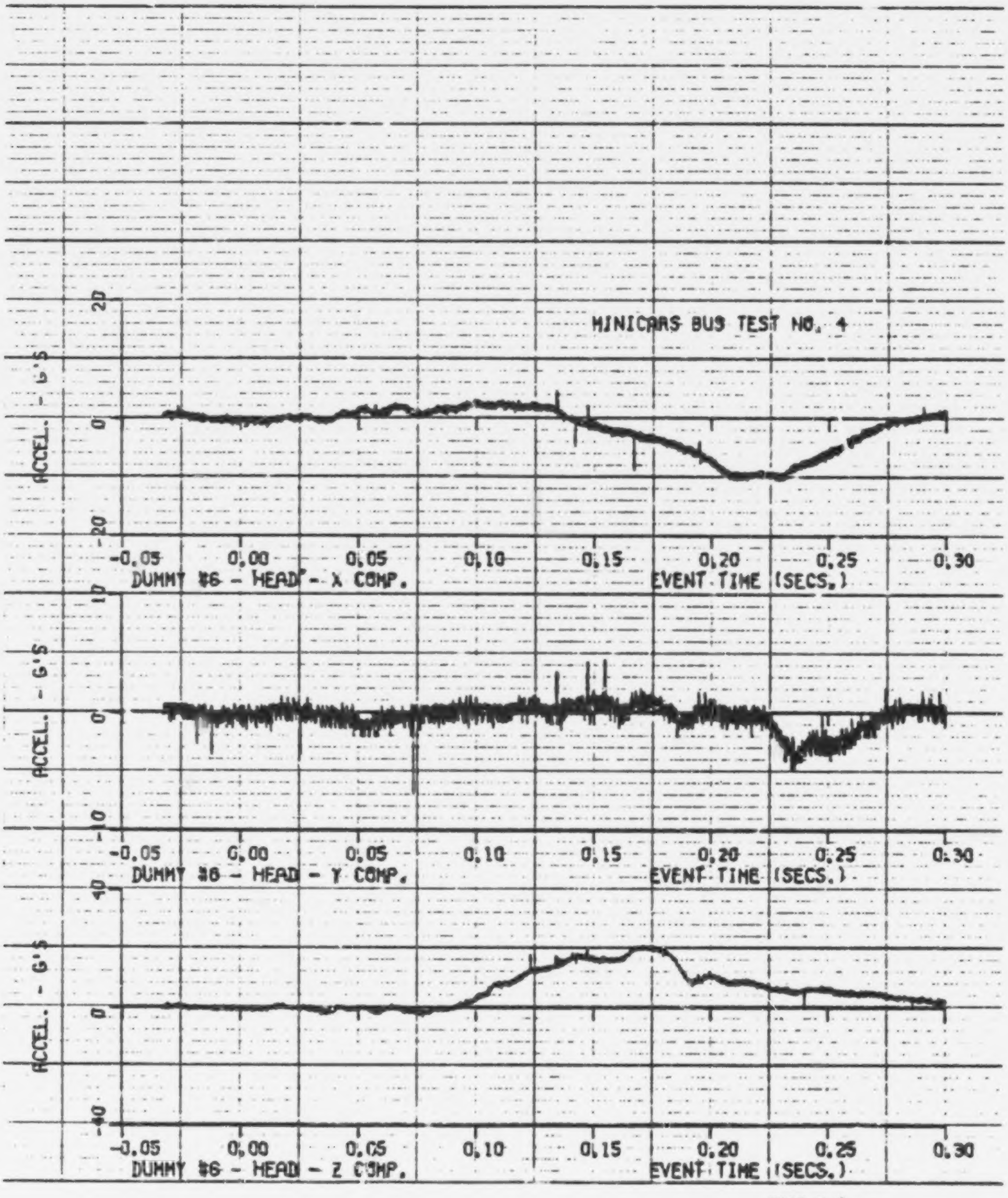
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
20
0
20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Z COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
0
-4
-8
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Z COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-10
20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Z COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
20
-20
-15
-10
-5
0
DUMMY #5 - CHEST - Z COMP.
DISP. - IN.

6440-V-3

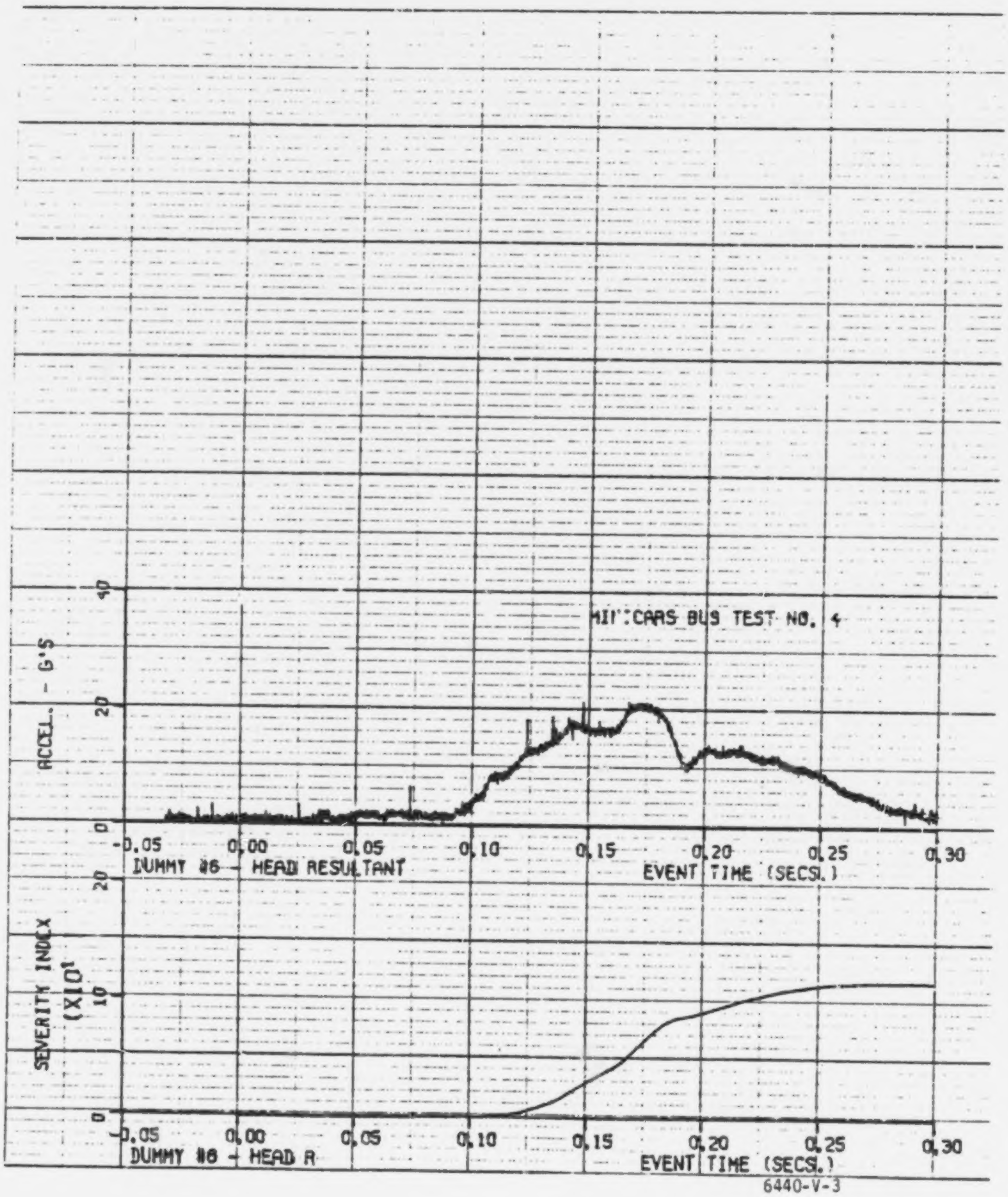

MINICARS BUS TEST NO. 4
ACCEL. - G'S
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
80
40
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST
EVENT TIME (SECS.)

6440-V-3.

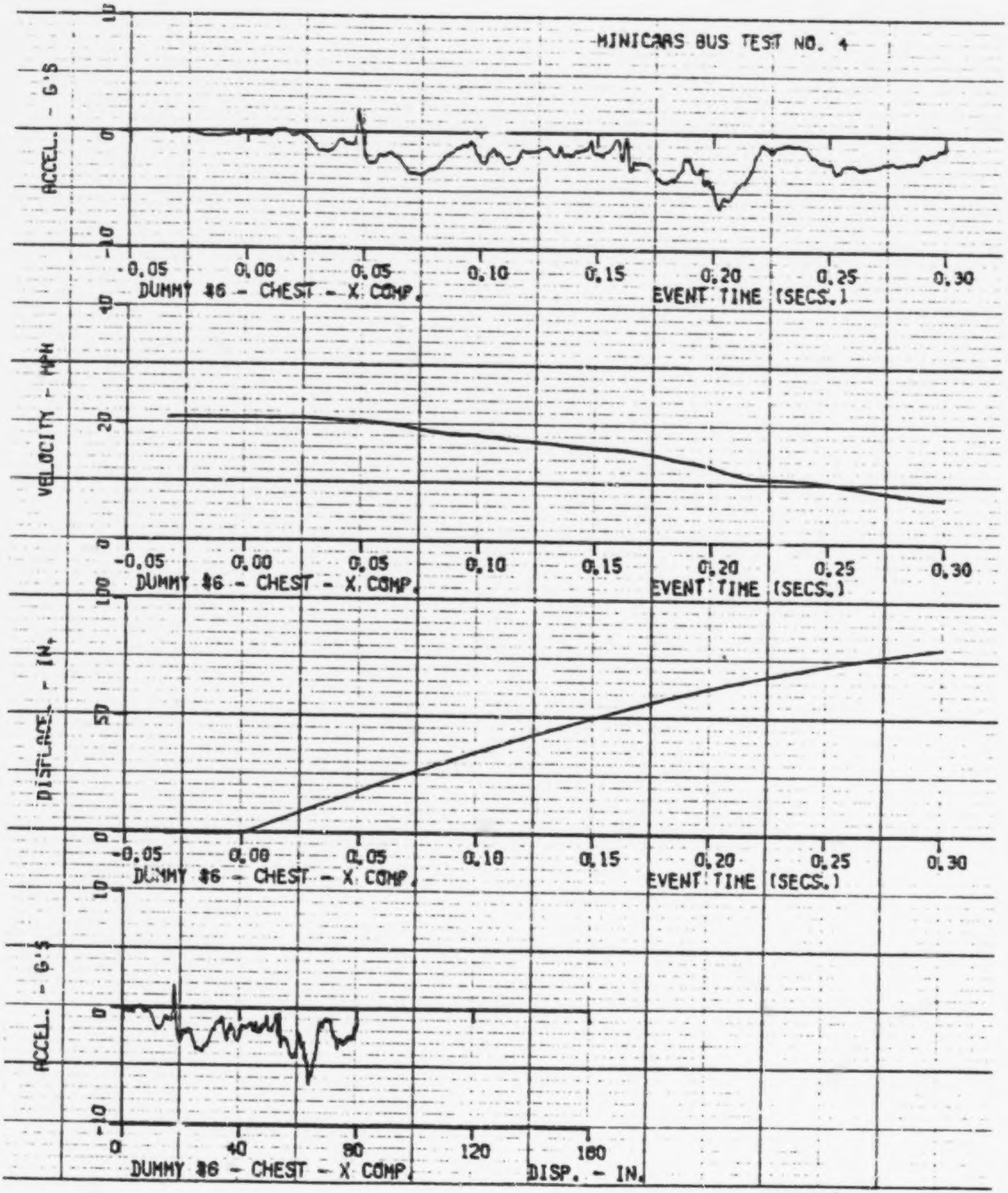

MINICARS BUS TEST NO. 4
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD - Z COMP.
EVENT TIME (SECS.)

6440-V-3

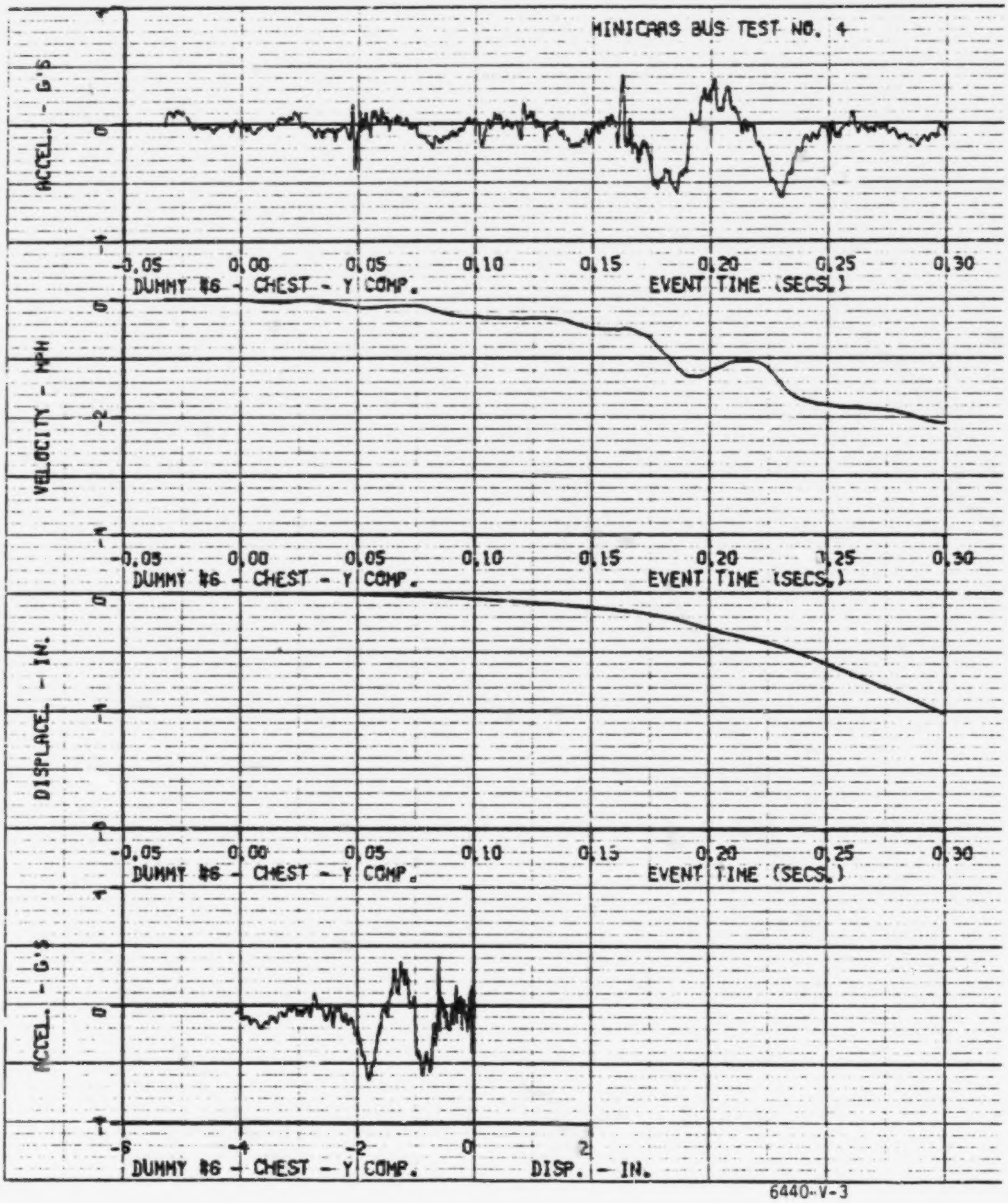
237


MINICARS BUS TEST NO. 4
ACCEL. - G'S
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX (X10^1)
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD R
EVENT TIME (SECS.)

6440-V-3

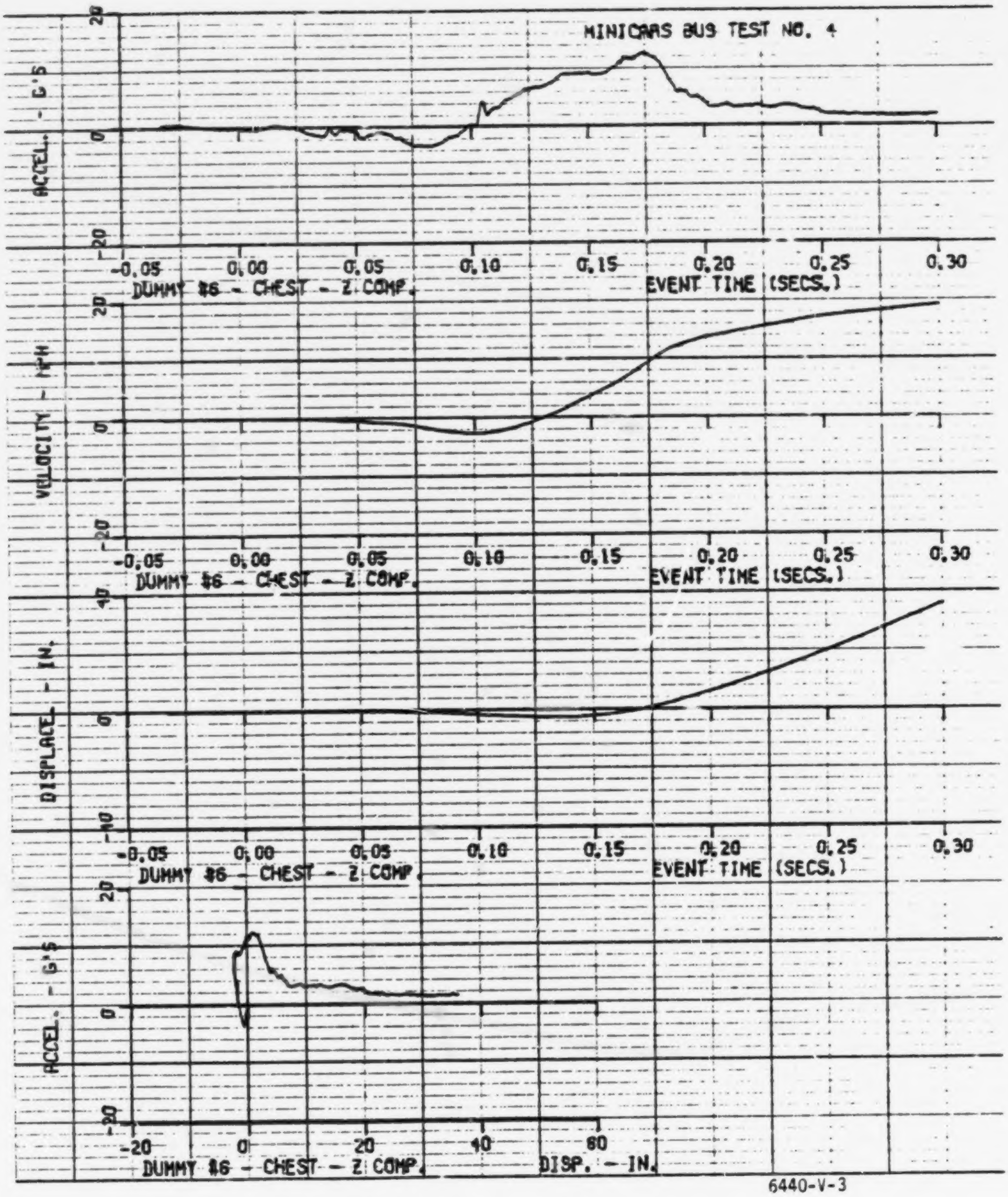

MINICARS BUS TEST NO. 4
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - X COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - X COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
100
50
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
0
40
80
120
160
DUMMY #6 - CHEST - X COMP.
DISP. - IN.

6440-V-3

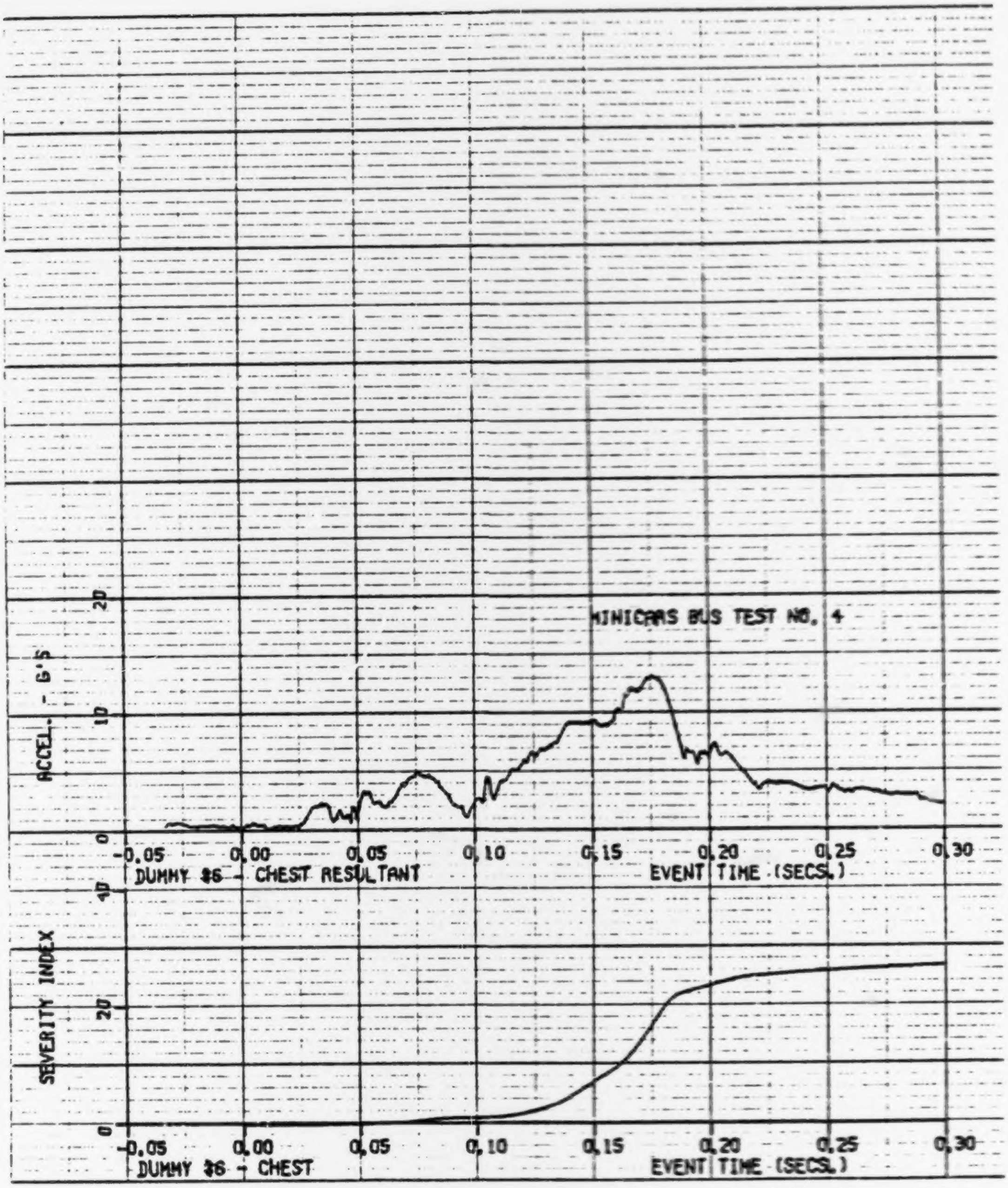

MINICARS BUS TEST NO. 4
ACCEL. - G'S
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Y COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
0
-2
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Y COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-1
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
4
0
-4
-6
-4
-2
0
2
DUMMY #6 - CHEST - Y COMP.
DISP. - IN.

6440-V-3

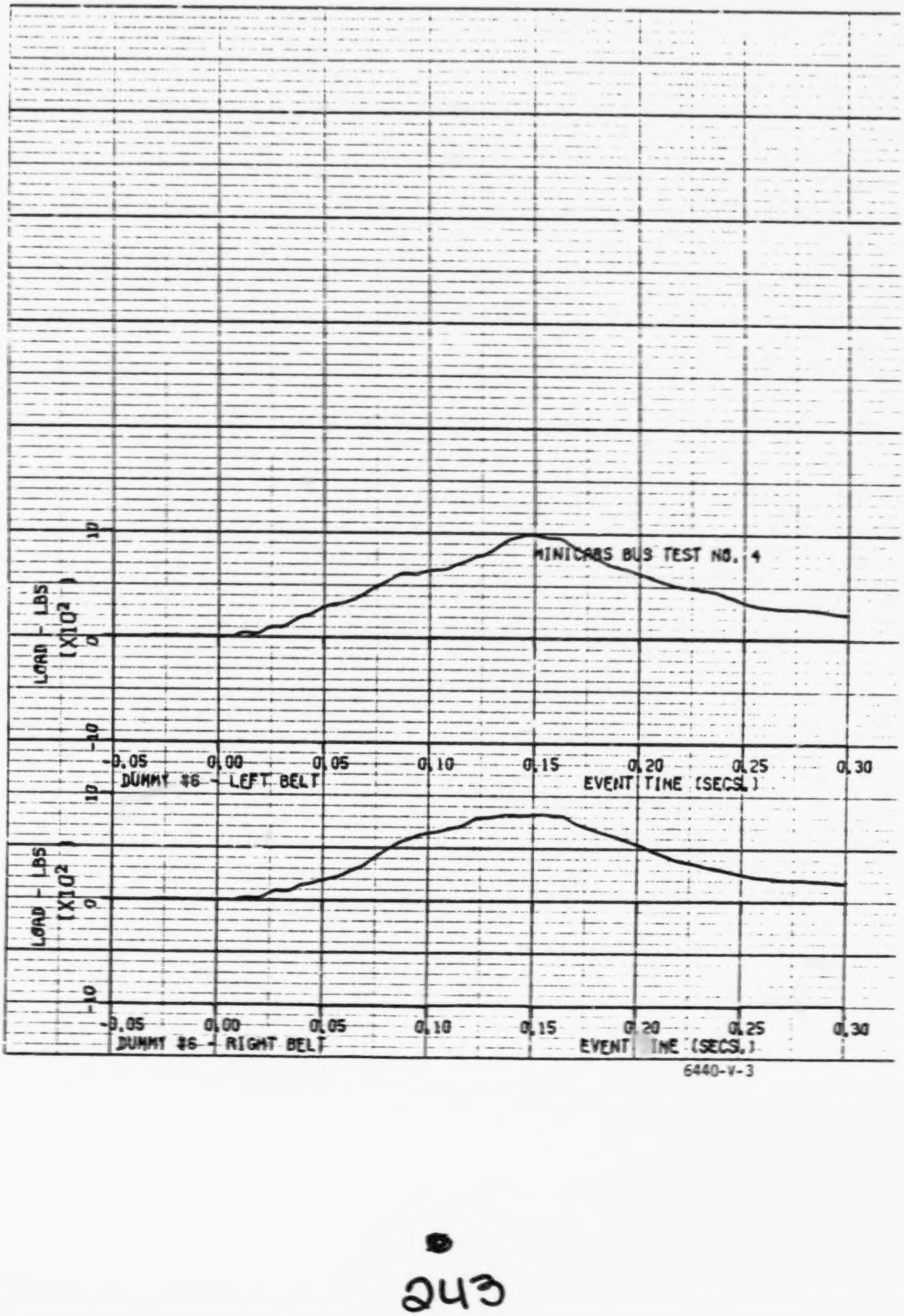
840


MINICARS BUS TEST NO. 4
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Z COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Z COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Z COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-20
0
20
40
60
DUMMY #6 - CHEST - Z COMP.
DISP. - IN.

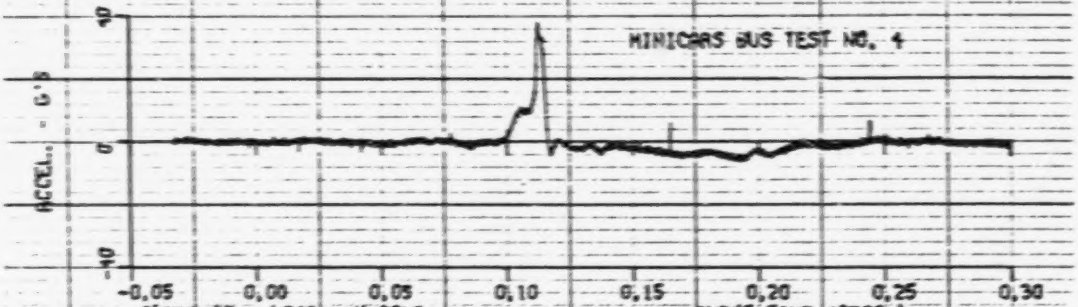
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST
EVENT TIME (SECS.)

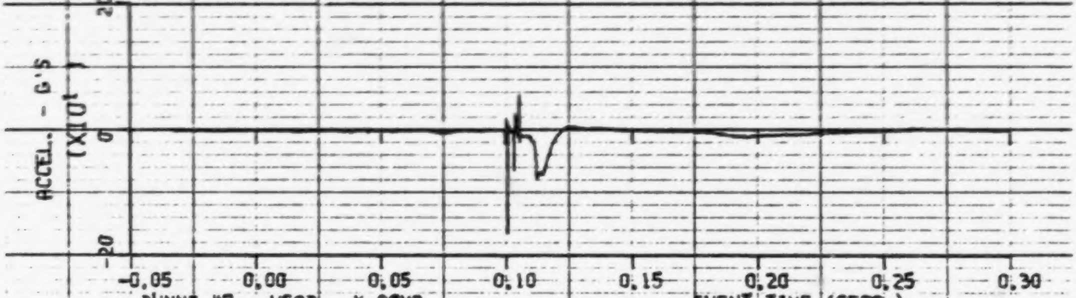
6440-V-3


MINICABS BUS TEST NO. 4
LOAD - LBS (X10²)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - LEFT BELT
EVENT TIME (SECS.)
LOAD - LBS (X10²)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - RIGHT BELT
EVENT TIME (SECS.)

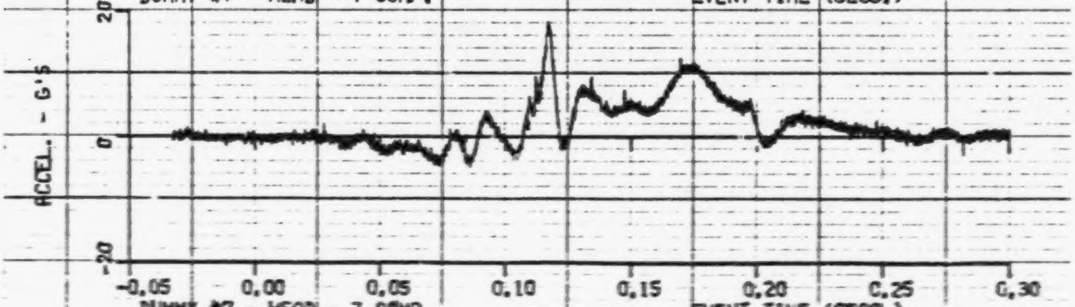
6440-V-3



DUMMY #7 - HEAD - X COMP.

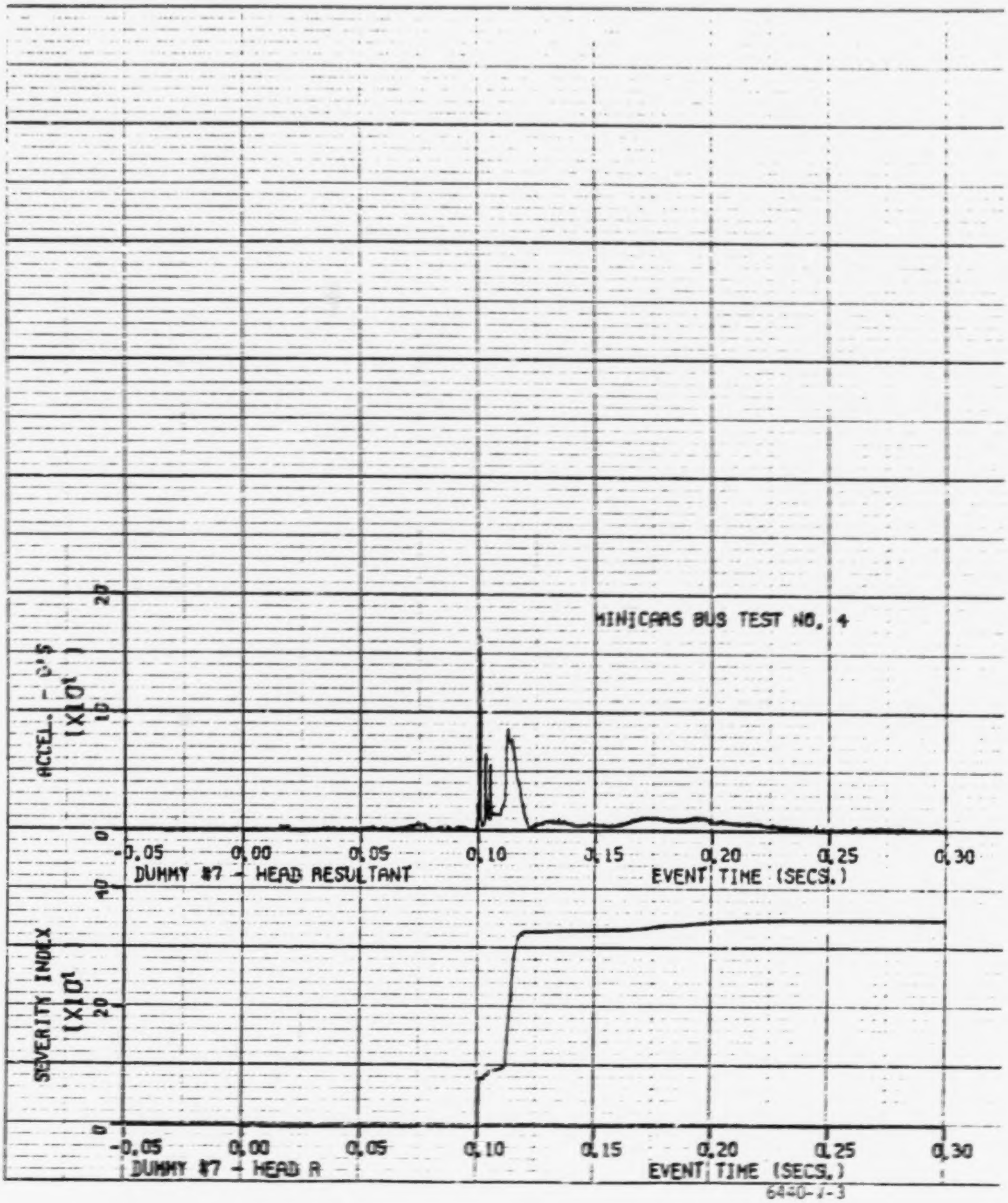


DUMMY #7 - HEAD - Y COMP.

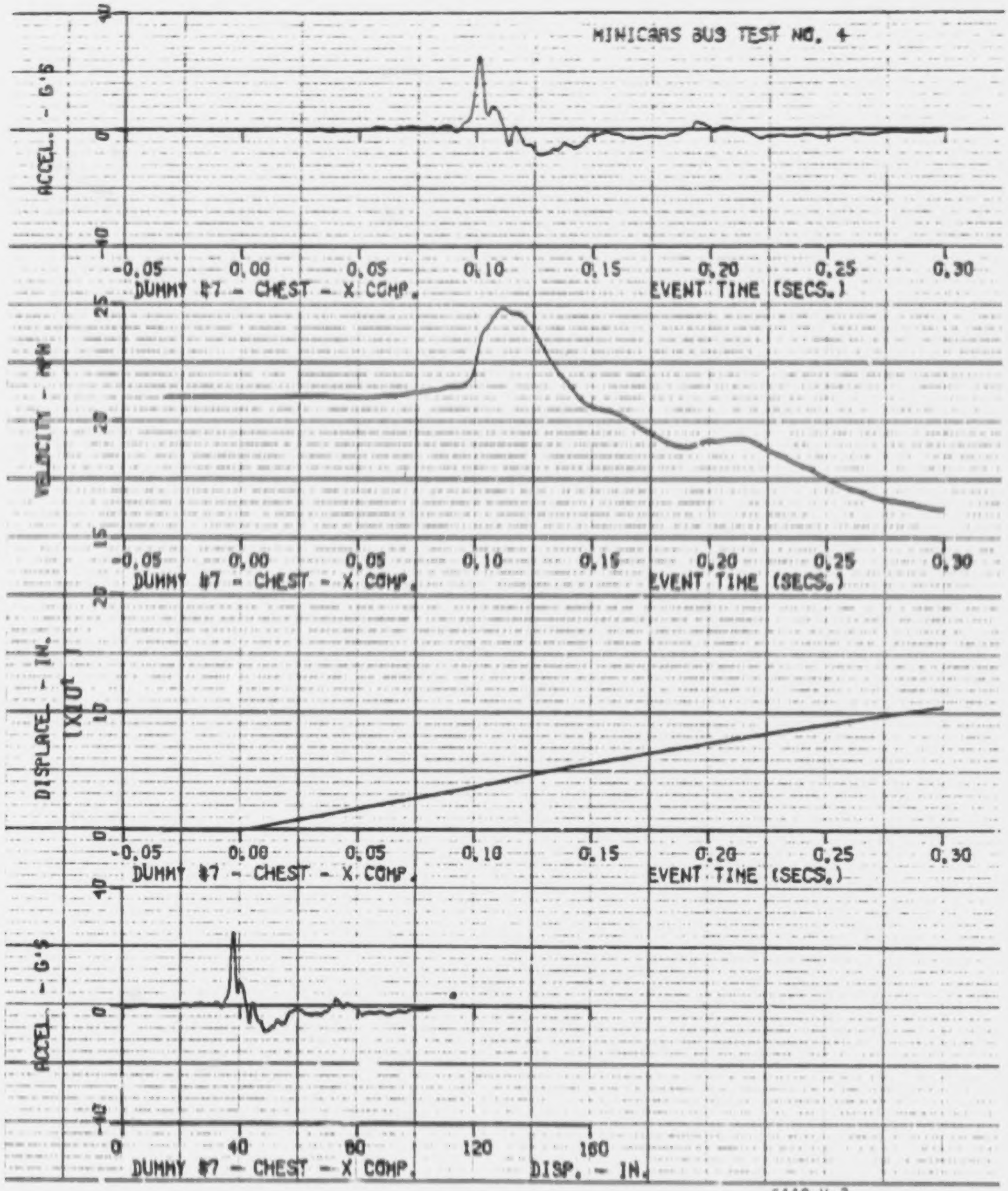


DUMMY #7 - HEAD - Z COMP.

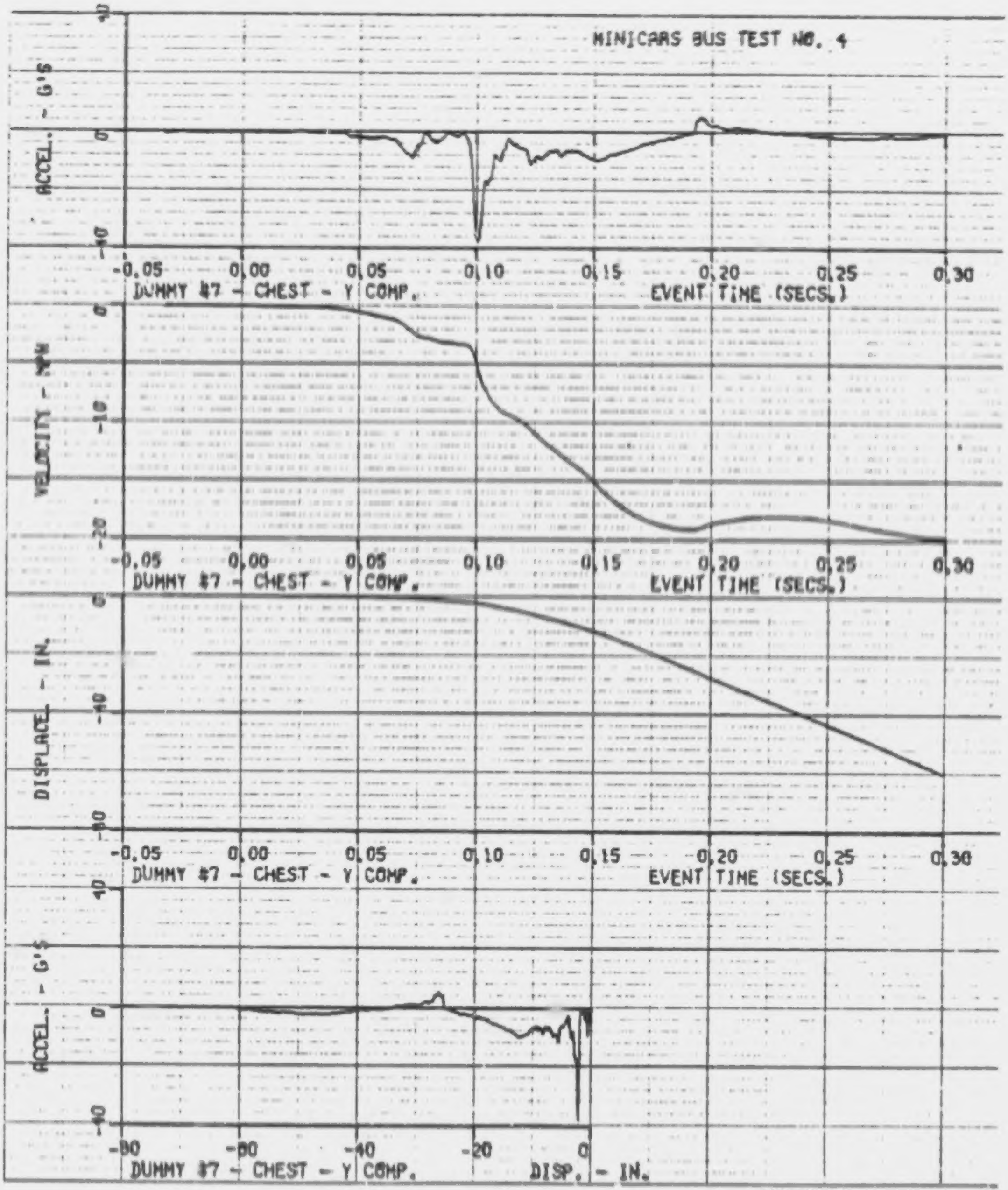
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
(X10¹)
0
10
20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
(X10¹
0
20
40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - HEAD R
EVENT TIME (SECS.)

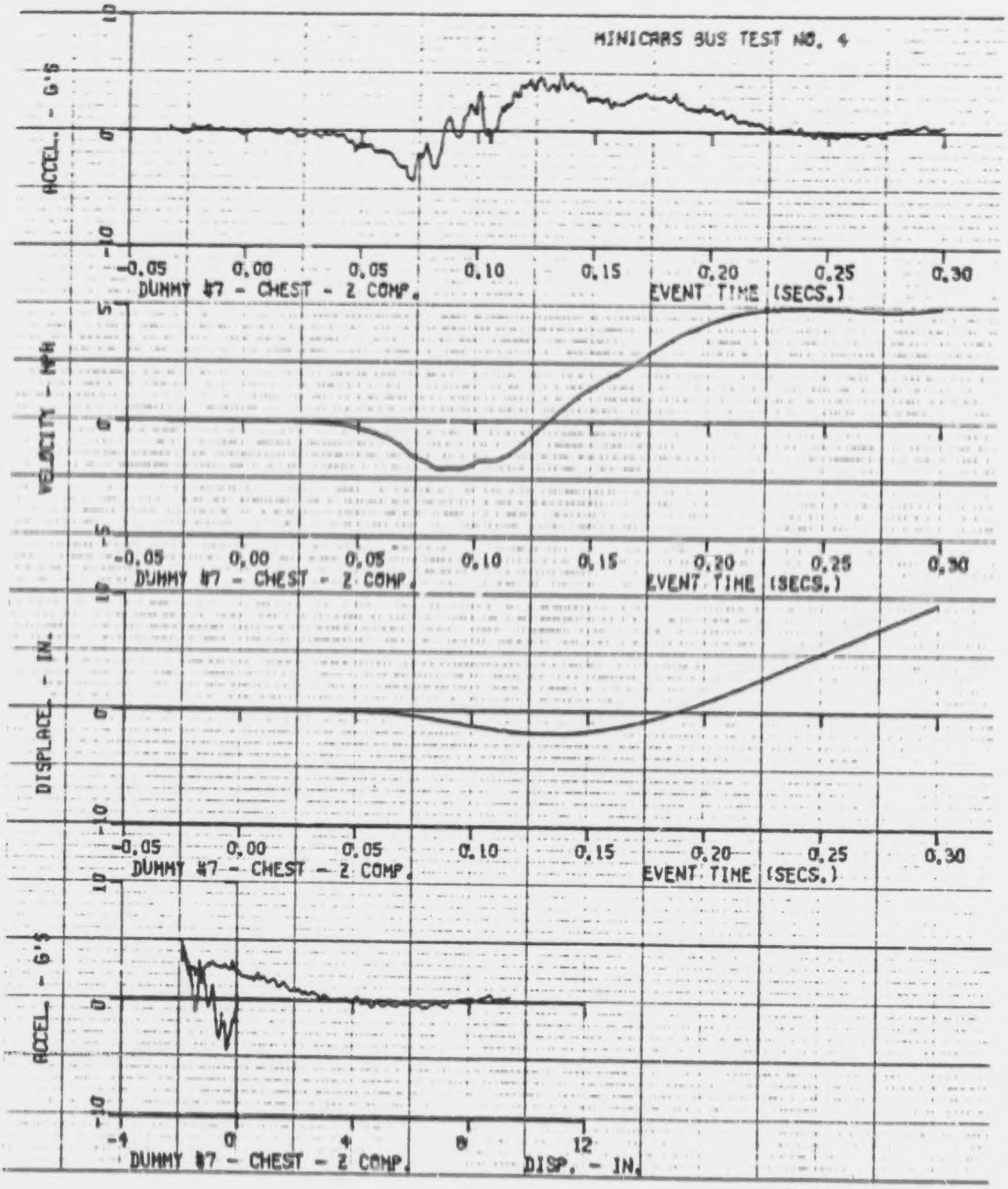
6440-7-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST - X COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
25
20
15
DUMMY #7 - CHEST - X COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
(X10¹)
20
10
0
DUMMY #7 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
0
40
80
120
160
DUMMY #7 - CHEST - X COMP.
DISP. - IN.

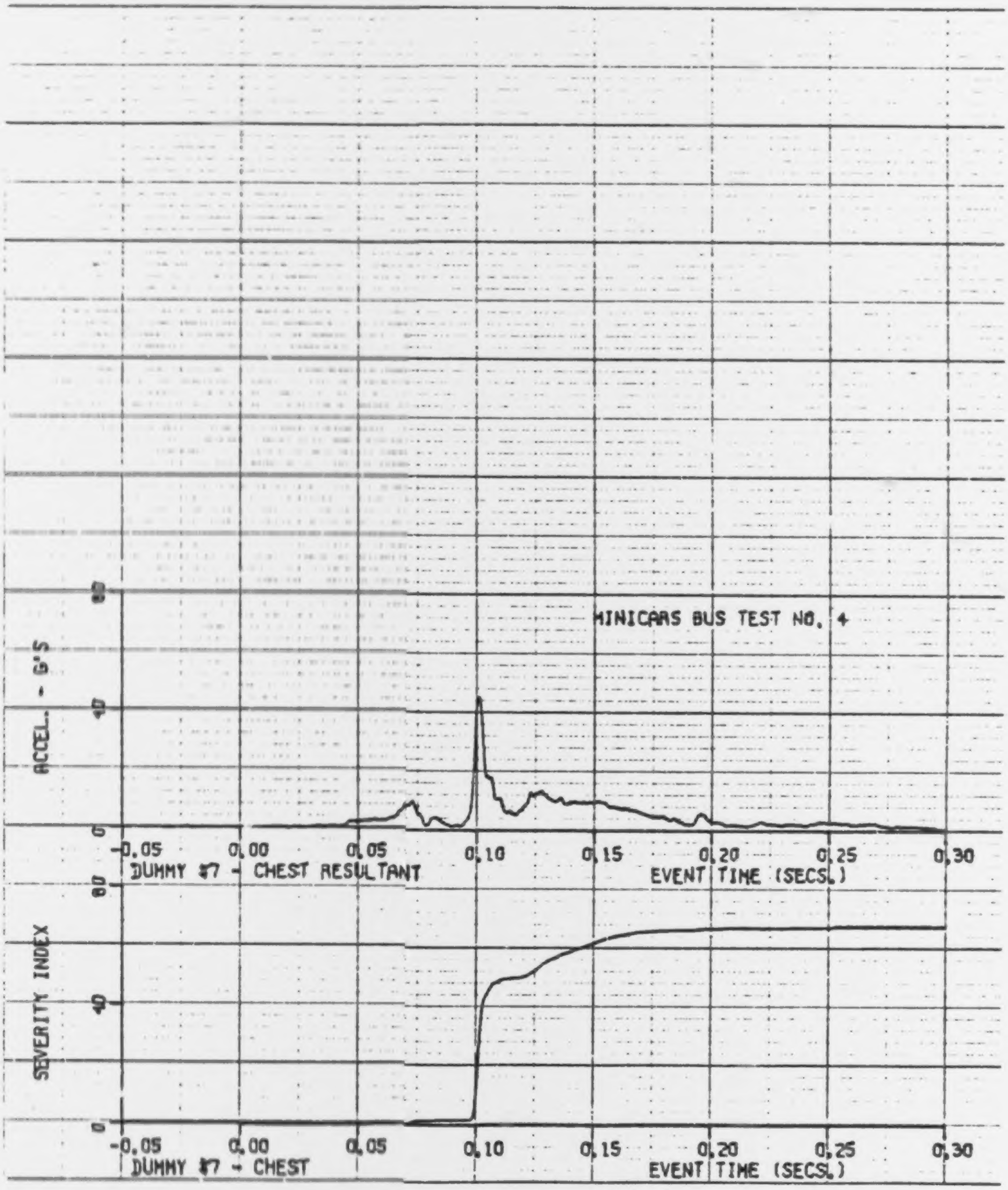
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST - Y COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
0
-10
-20
DUMMY #7 - CHEST - Y COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-10
-20
DUMMY #7 - CHEST - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-80
-60
-40
-20
0
DUMMY #7 - CHEST - Y COMP.
DISP. - IN.

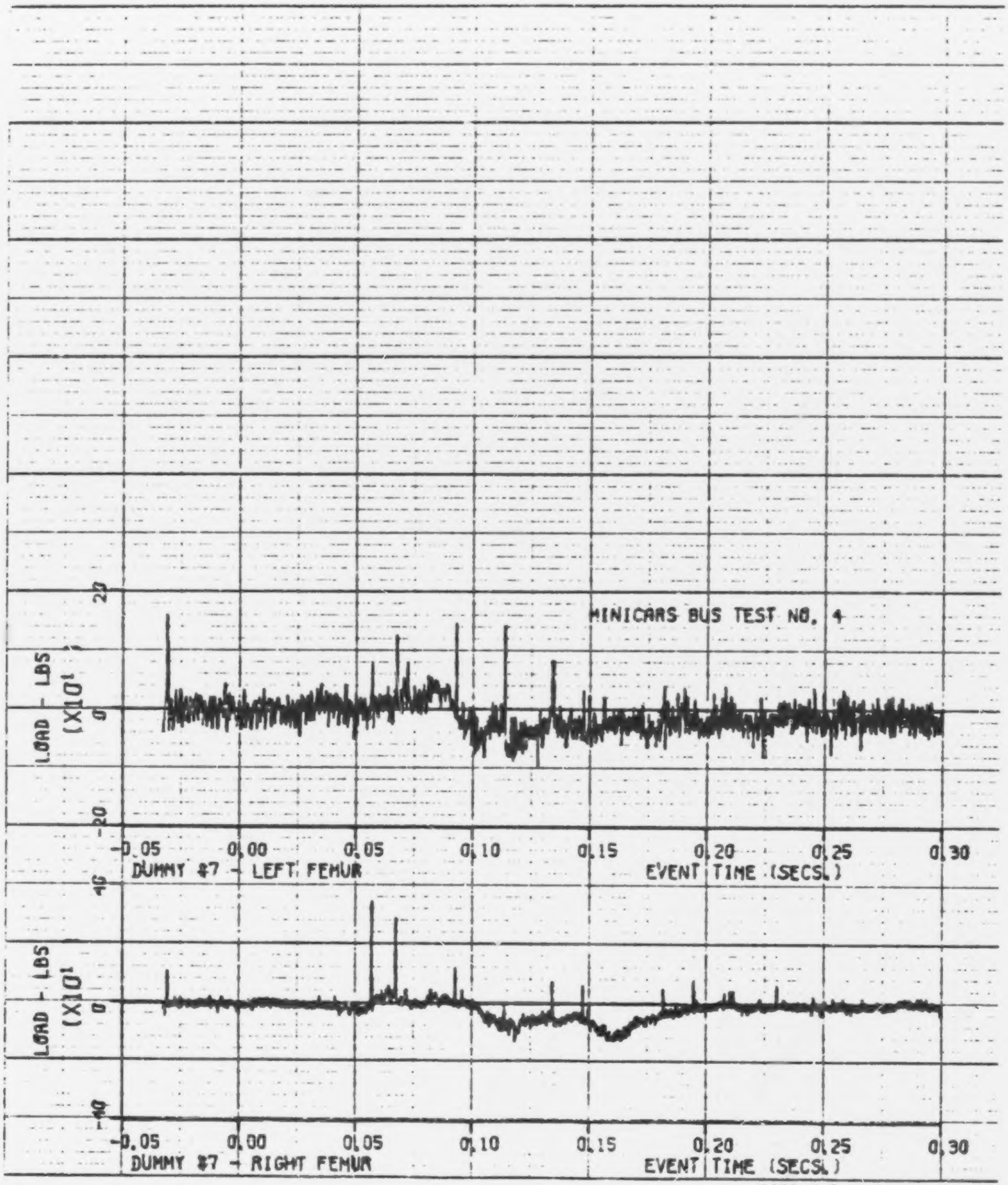
6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST - Z COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST - Z COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST - Z COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-4
0
4
8
12
DUMMY #7 - CHEST - Z COMP.
DISP. - IN.

6440-V-3


MINICARS BUS TEST NO. 4
ACCEL. - G'S
0
40
80
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
0
40
80
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST
EVENT TIME (SECS.)

6440-V-3

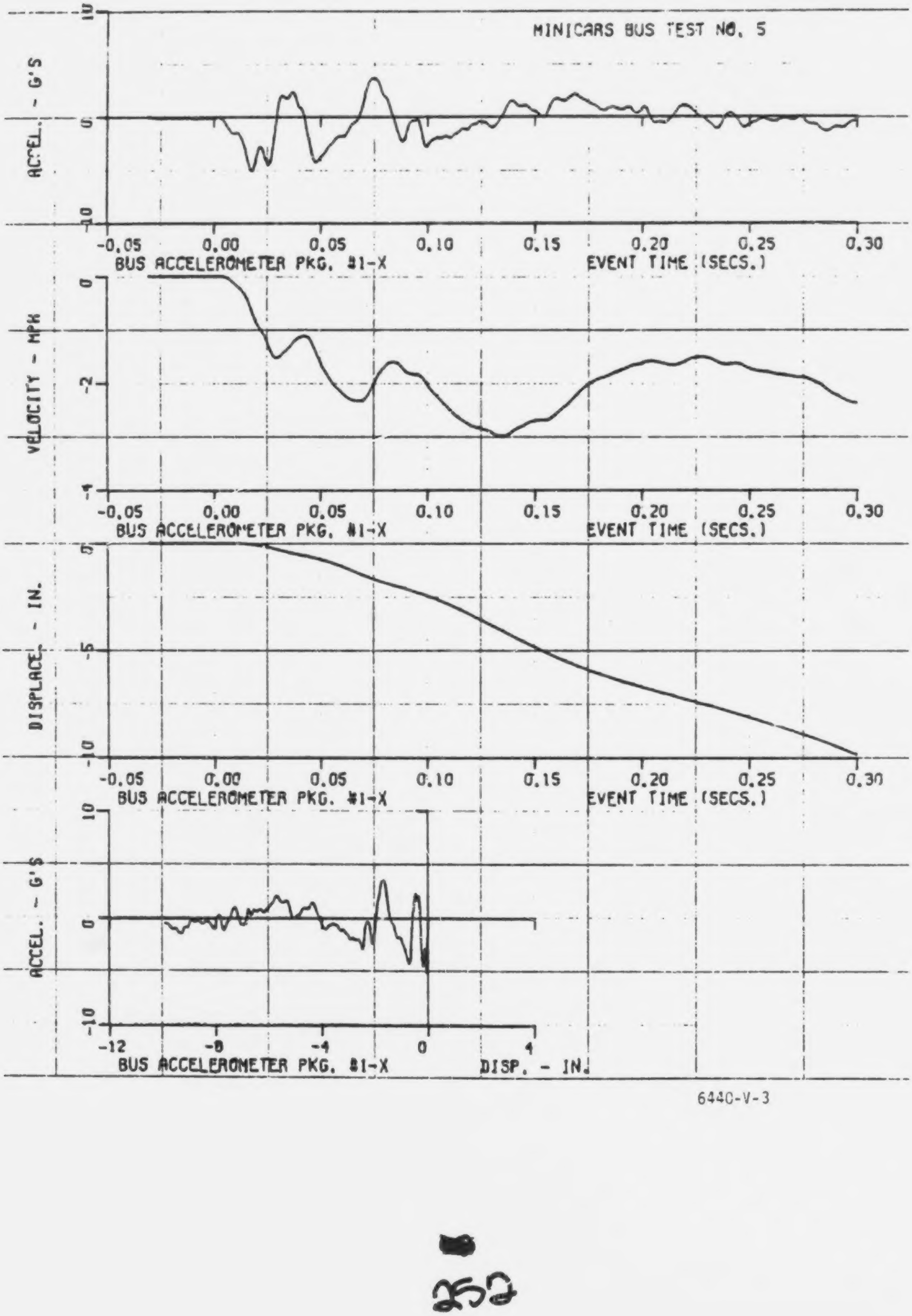

MINICARS BUS TEST NO. 4
LOAD - LBS (X10¹)
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - LEFT FEMUR
EVENT TIME (SECS.)
LOAD - LBS (X10¹)
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - RIGHT FEMUR
EVENT TIME (SECS.)

6440-V-3

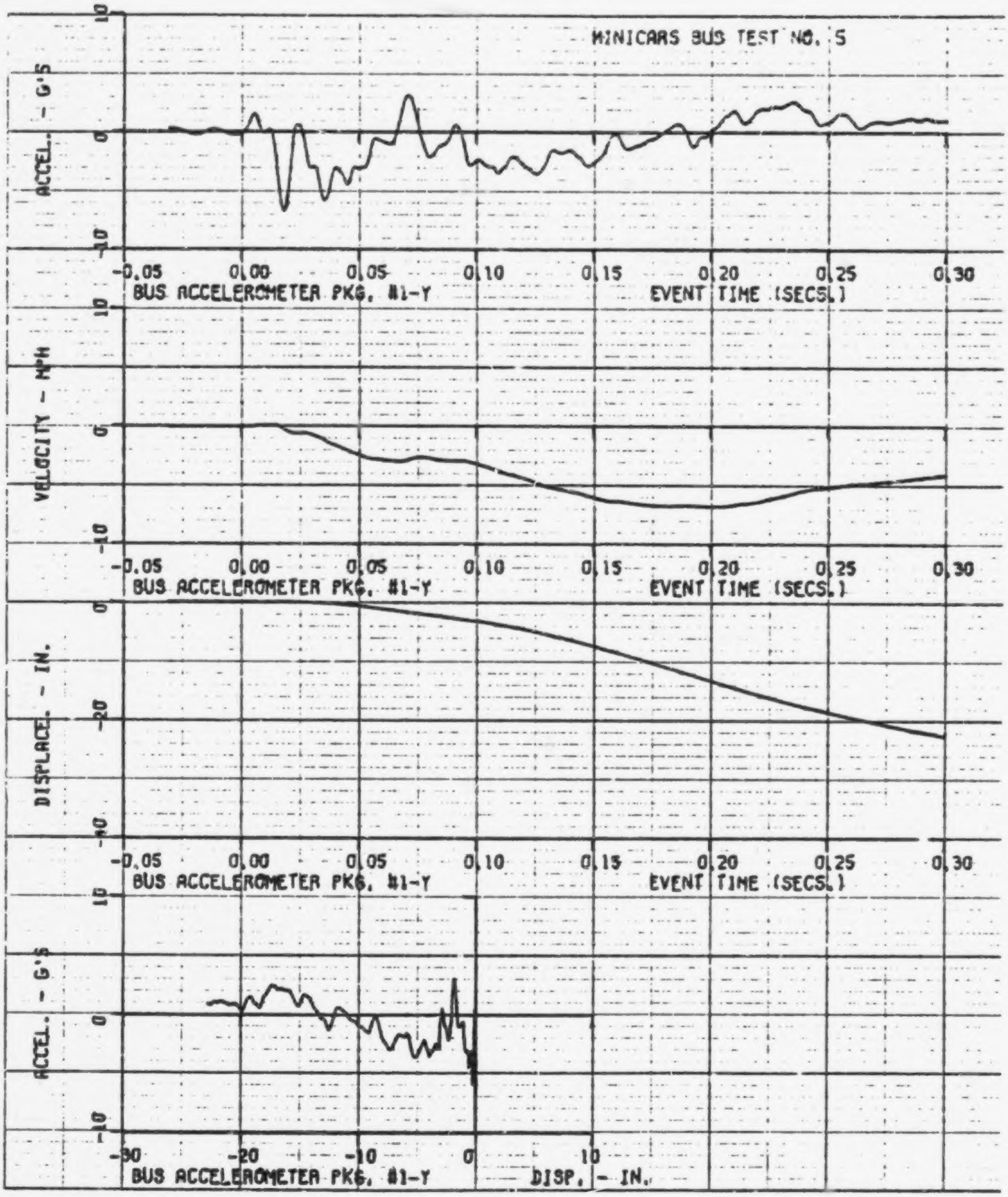
APPENDIX 2

TEST NO. 5 DATA

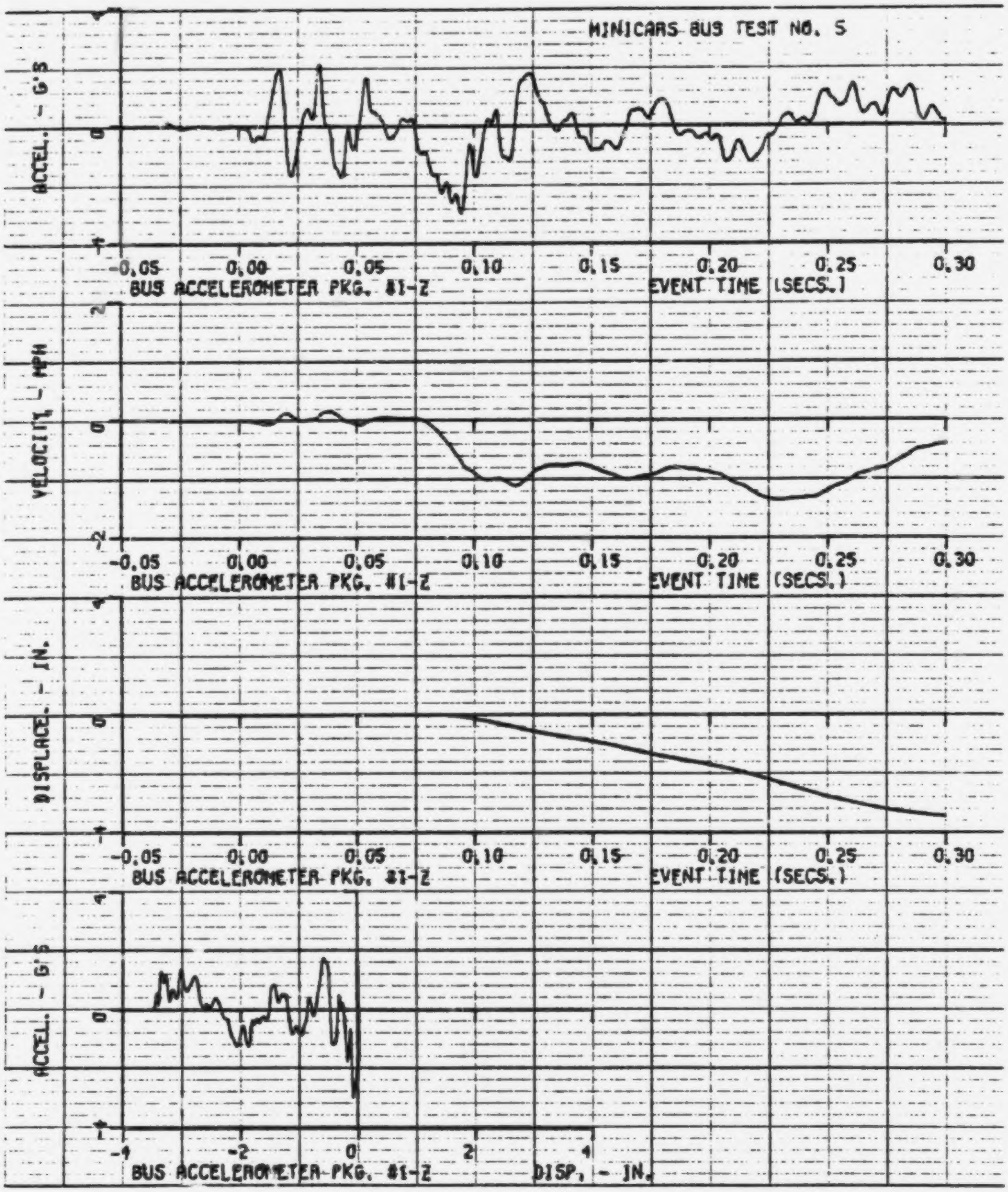
	FILTER CHANNEL CLASS
VEHICLE DATA	60
HEAD ACCELERATION	1000
CHEST ACCELERATION	180
BELT LOADS	60
FEMUR LOADS	600
MOVING BARRIER	60


MINICARS BUS TEST NO. 5
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-X
EVENT TIME (SECS.)
VELOCITY - MPH
0
-2
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-X
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-5
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-X
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-12
-8
-4
0
4
BUS ACCELEROMETER PKG. #1-X
DISP. - IN.

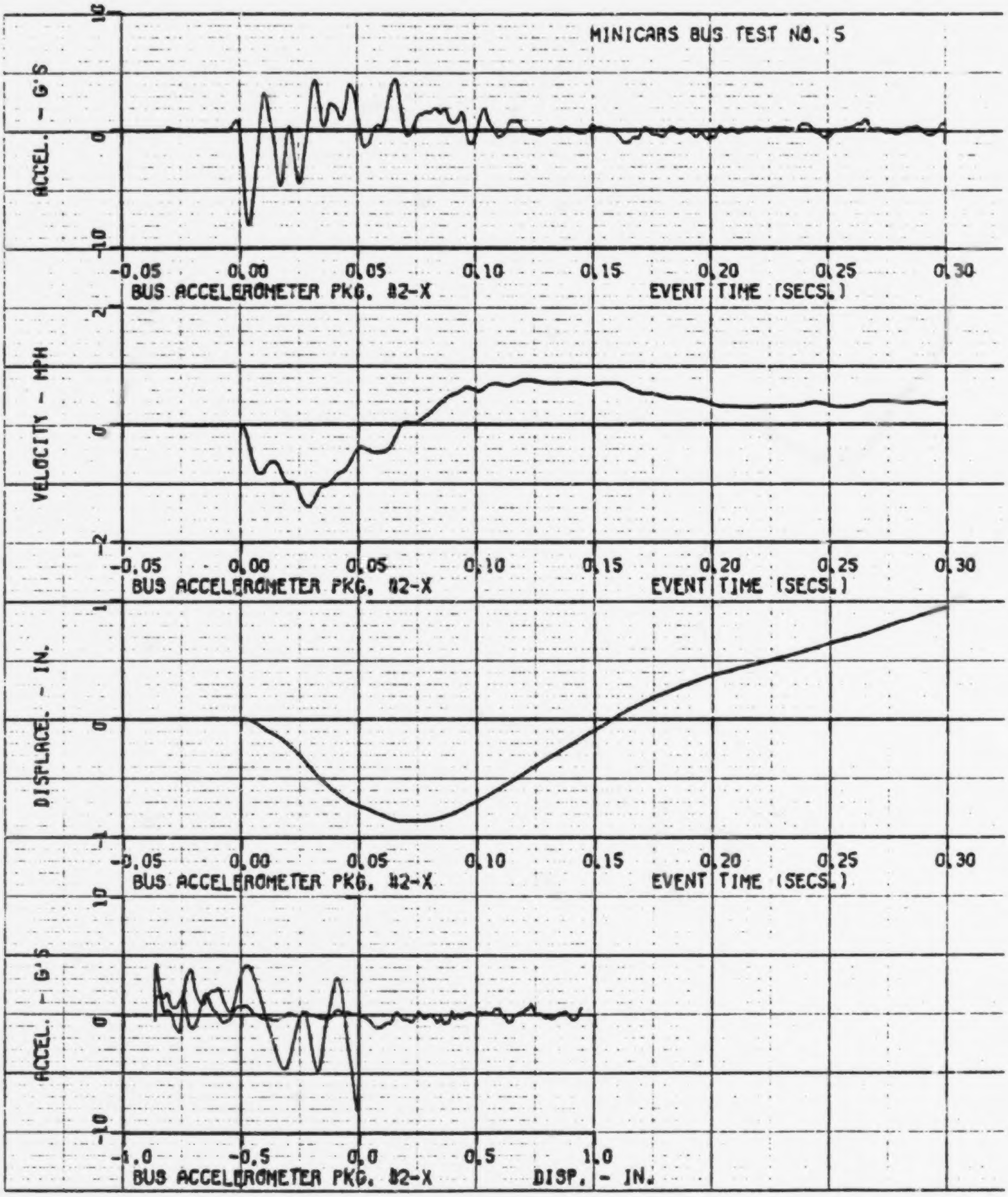
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Y
EVENT TIME (SECS.)
VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Y
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-20
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Y
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-30
-20
-10
0
10
BUS ACCELEROMETER PKG. #1-Y
DISP. - IN.

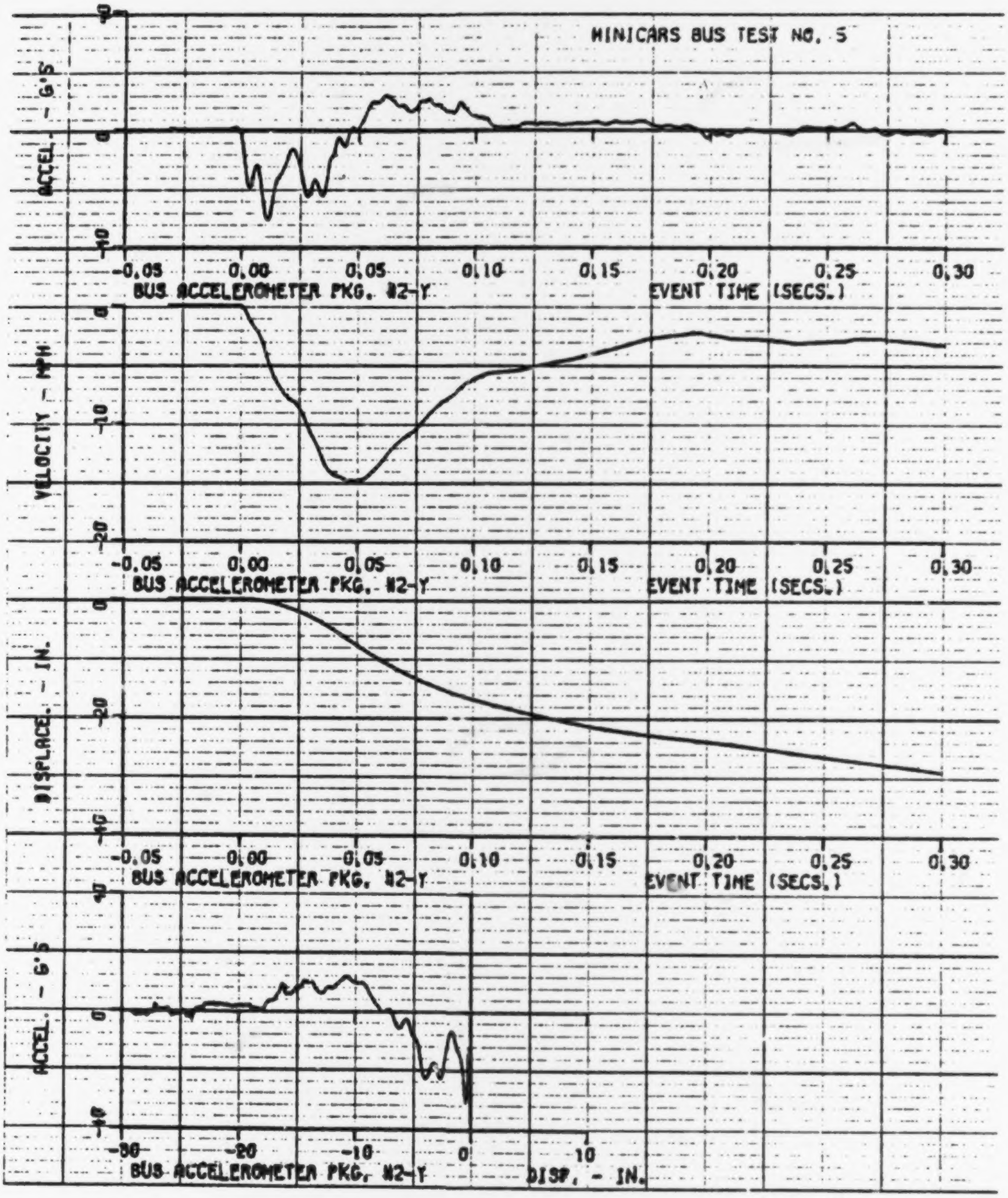
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Z
EVENT TIME (SECS.)
VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Z
EVENT TIME (SECS.)
ACCEL. - G'S
0
-4
-2
0
2
4
BUS ACCELEROMETER PKG. #1-Z
DISP. - IN.

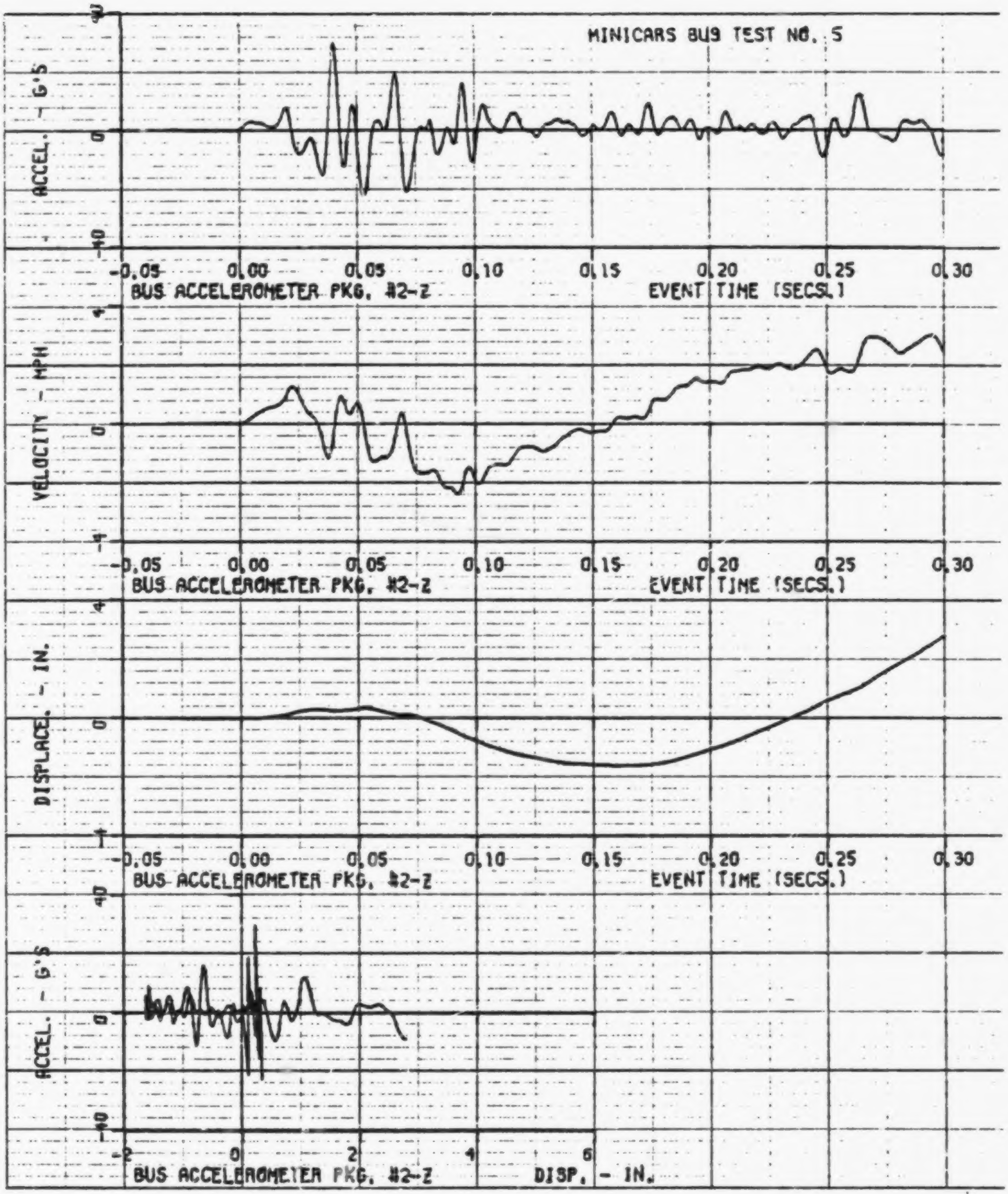
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-X
EVENT TIME (SECS.)
VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-X
EVENT TIME (SECS.)
DISPLACE. - IN.
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-X
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-1.0
-0.5
0.0
0.5
1.0
BUS ACCELEROMETER PKG. #2-X
DISP. - IN.

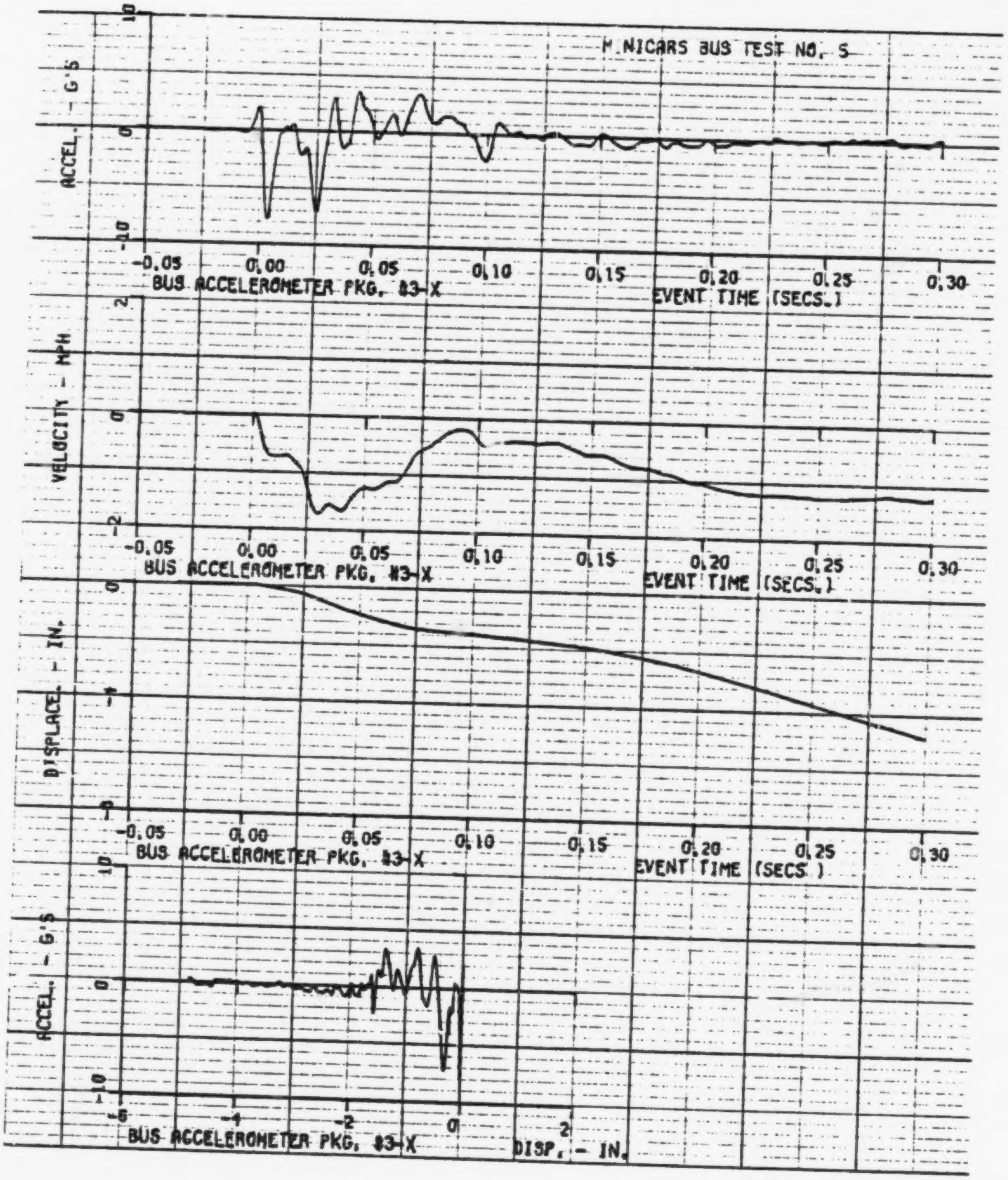
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
10
0
10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-Y
EVENT TIME (SECS.)
VELOCITY - MPH
0
10
20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-Y
EVENT TIME (SECS.)
DISPLACE. - IN.
0
20
40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-Y
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
10
-30
-20
-10
0
10
BUS ACCELEROMETER PKG. #2-Y
DISP. - IN.

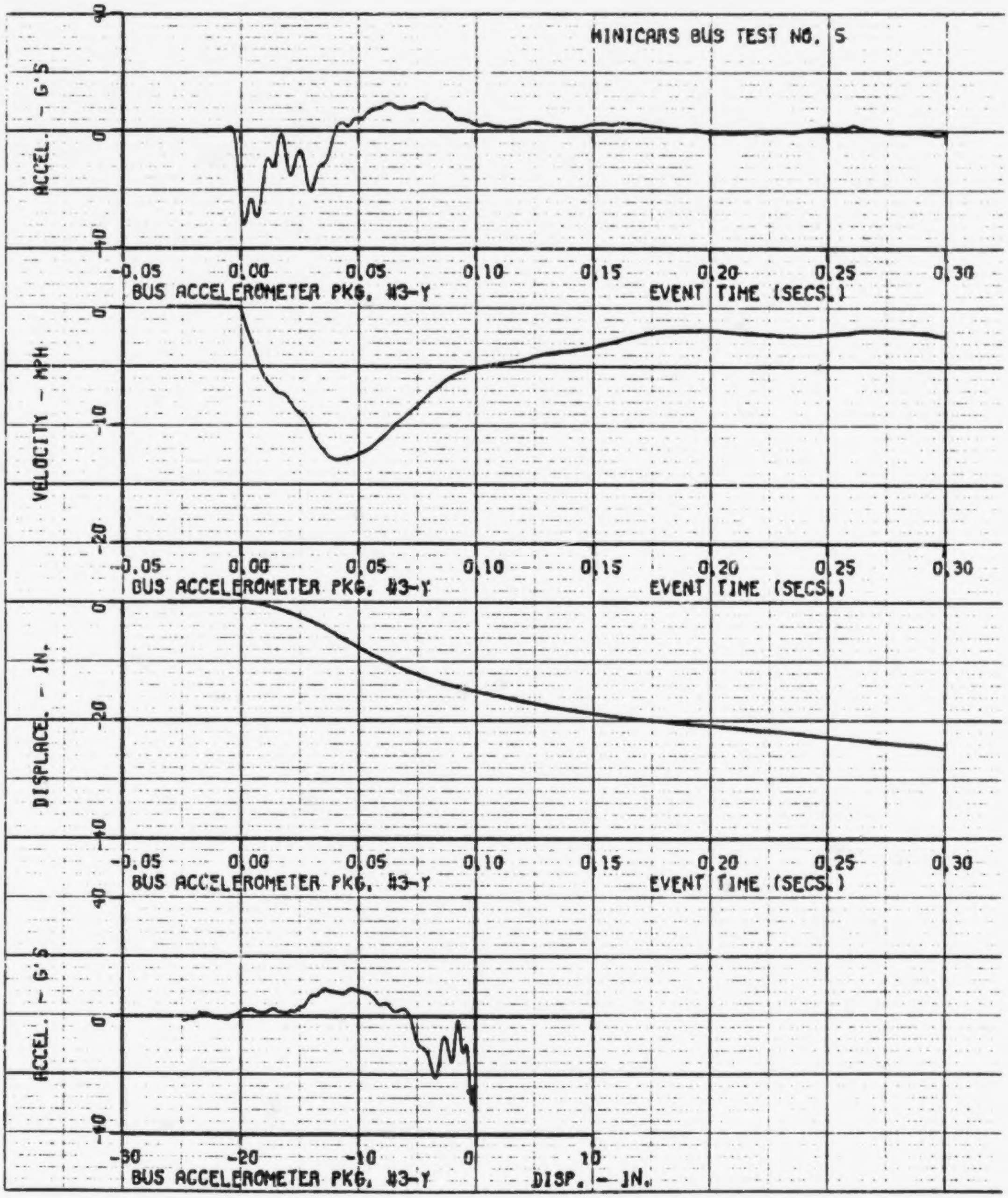
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-Z
EVENT TIME (SECS.)
VELOCITY - MPH
4
0
-4
DISPLACE. - IN.
4
0
-4
ACCEL. - G'S
40
0
-40
-2
0
2
4
6
DISP. - IN.

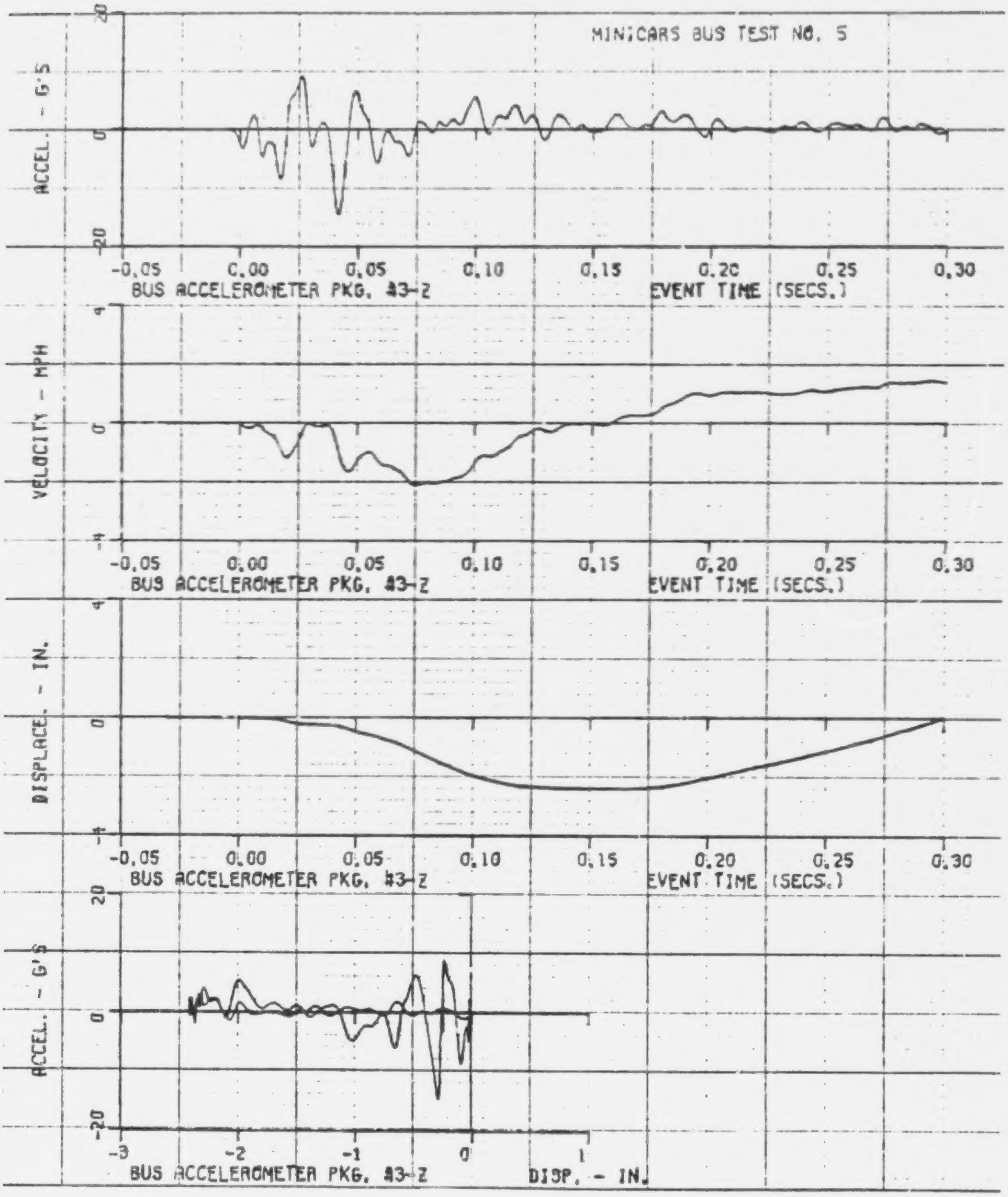
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-X
EVENT TIME (SECS.)
VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-X
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-1
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-X
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-6
-4
-2
0
2
BUS ACCELEROMETER PKG. #3-X
DISP. - IN.

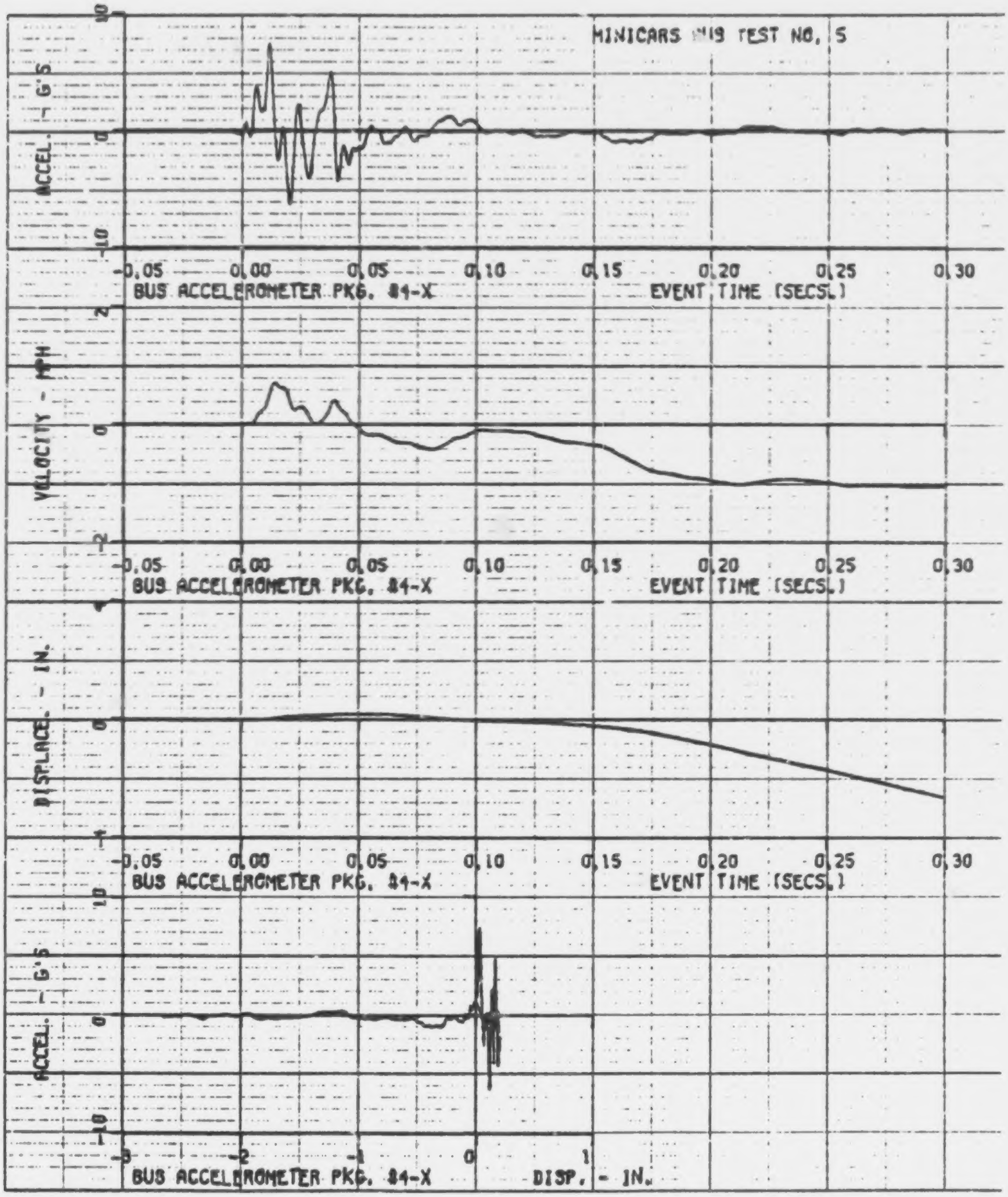
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. – G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-Y
EVENT TIME (SECS.)
VELOCITY – MPH
0
-10
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-Y
EVENT TIME (SECS.)
DISPLACE. – IN.
0
-20
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-Y
EVENT TIME (SECS.)
ACCEL. – G'S
10
0
-10
-30
-20
-10
0
10
BUS ACCELEROMETER PKG. #3-Y
DISP. – IN.

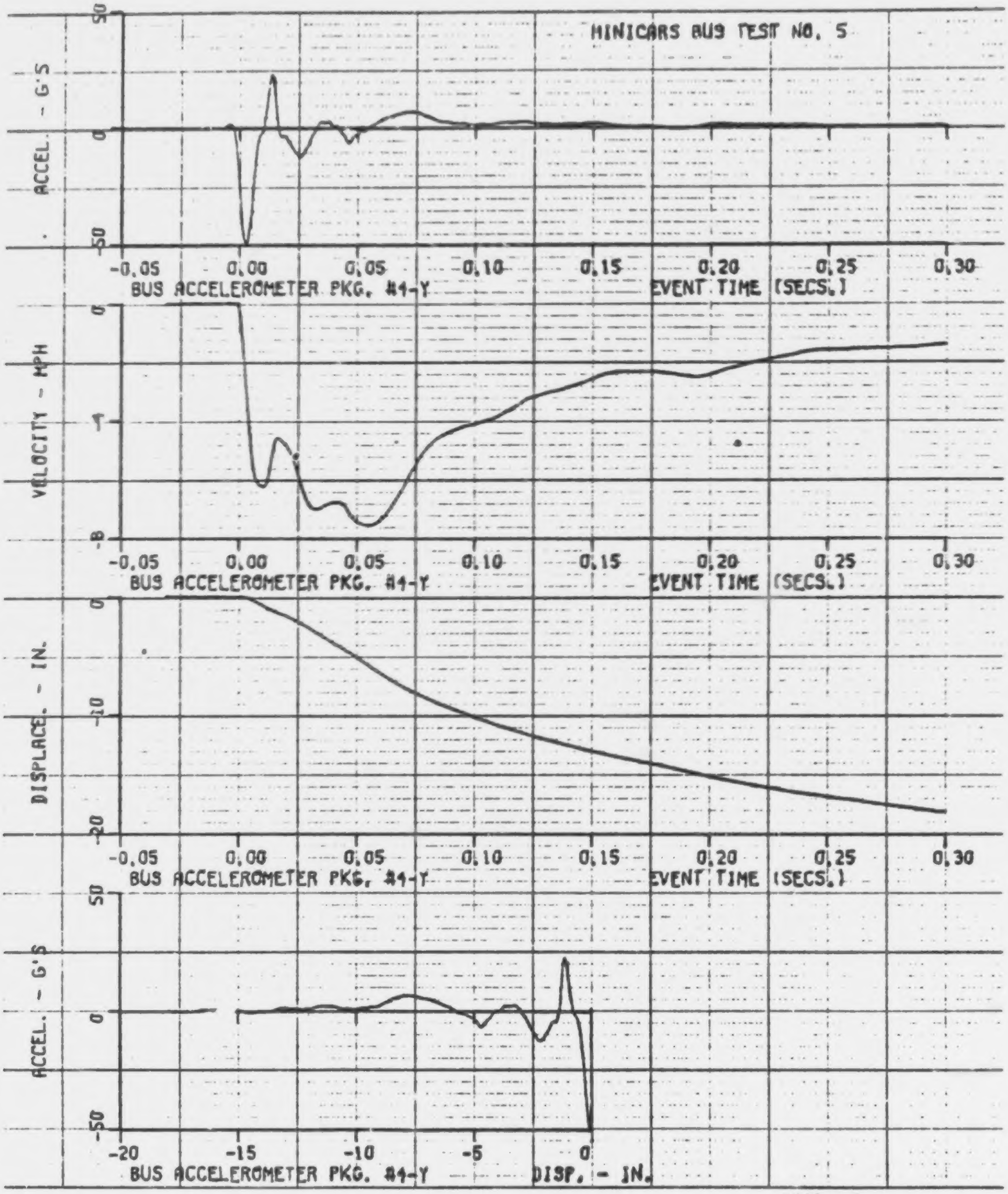
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-Z
EVENT TIME (SECS.)
VELOCITY - MPH
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-Z
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-3
-2
-1
0
1
BUS ACCELEROMETER PKG. #3-Z
DISP. - IN.

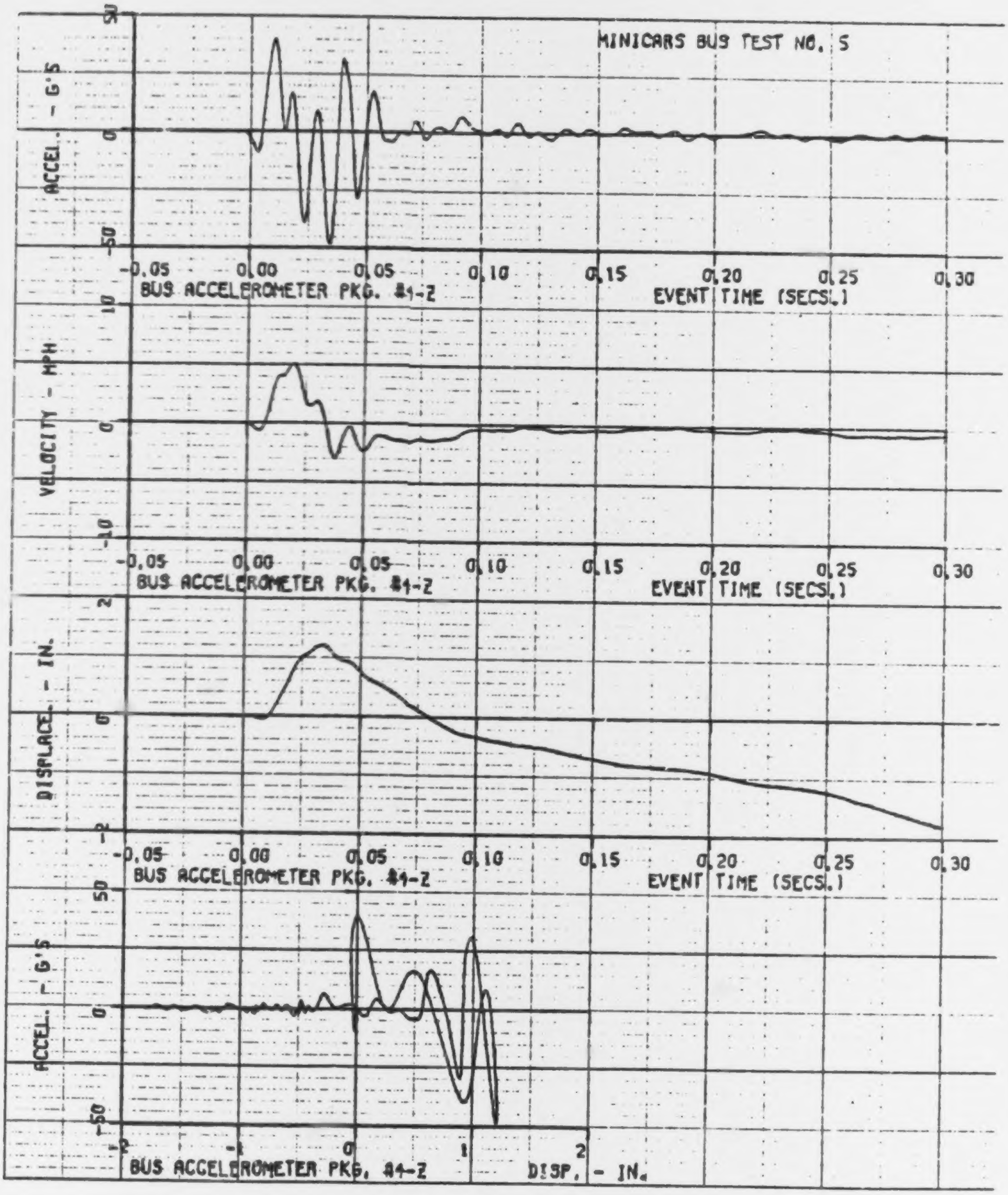
6440-V-3


MINICARS M19 TEST NO. 5
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. 84-X
EVENT TIME (SECS.)
VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. 84-X
EVENT TIME (SECS.)
DISPLACE. - IN.
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. 84-X
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-3
-2
-1
0
1
BUS ACCELEROMETER PKG. 84-X
DISP. - IN.

6440-V-3

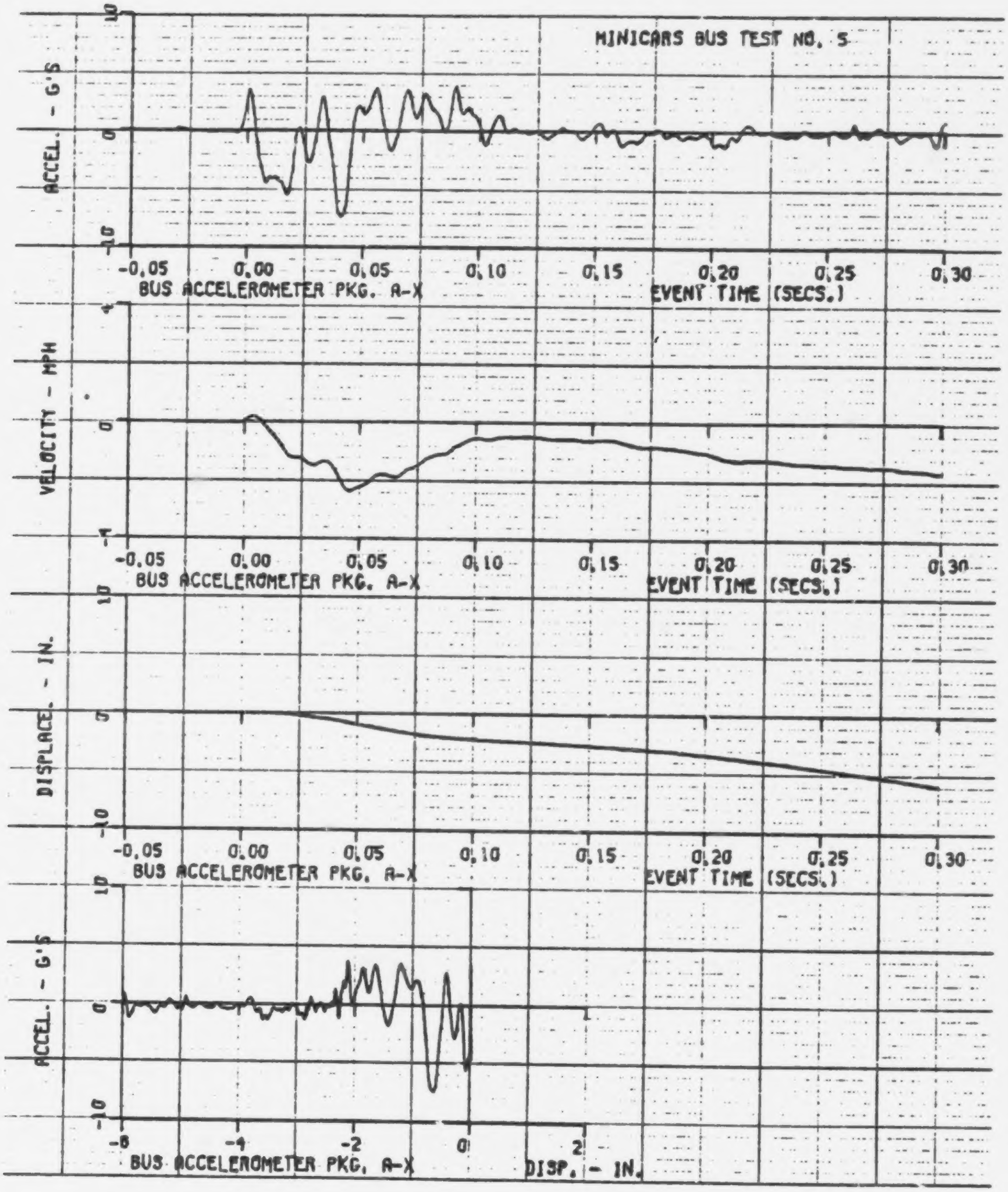

MINICARS BUS TEST NO. 5
ACCEL. - G'S
50
0
-50
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-Y
EVENT TIME (SECS.)
VELOCITY - MPH
0
-4
-8
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-Y
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-10
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-Y
EVENT TIME (SECS.)
ACCEL. - G'S
50
0
-50
-20
-15
-10
-5
0
BUS ACCELEROMETER PKG. #4-Y
DISP. - IN.

6440-V-3

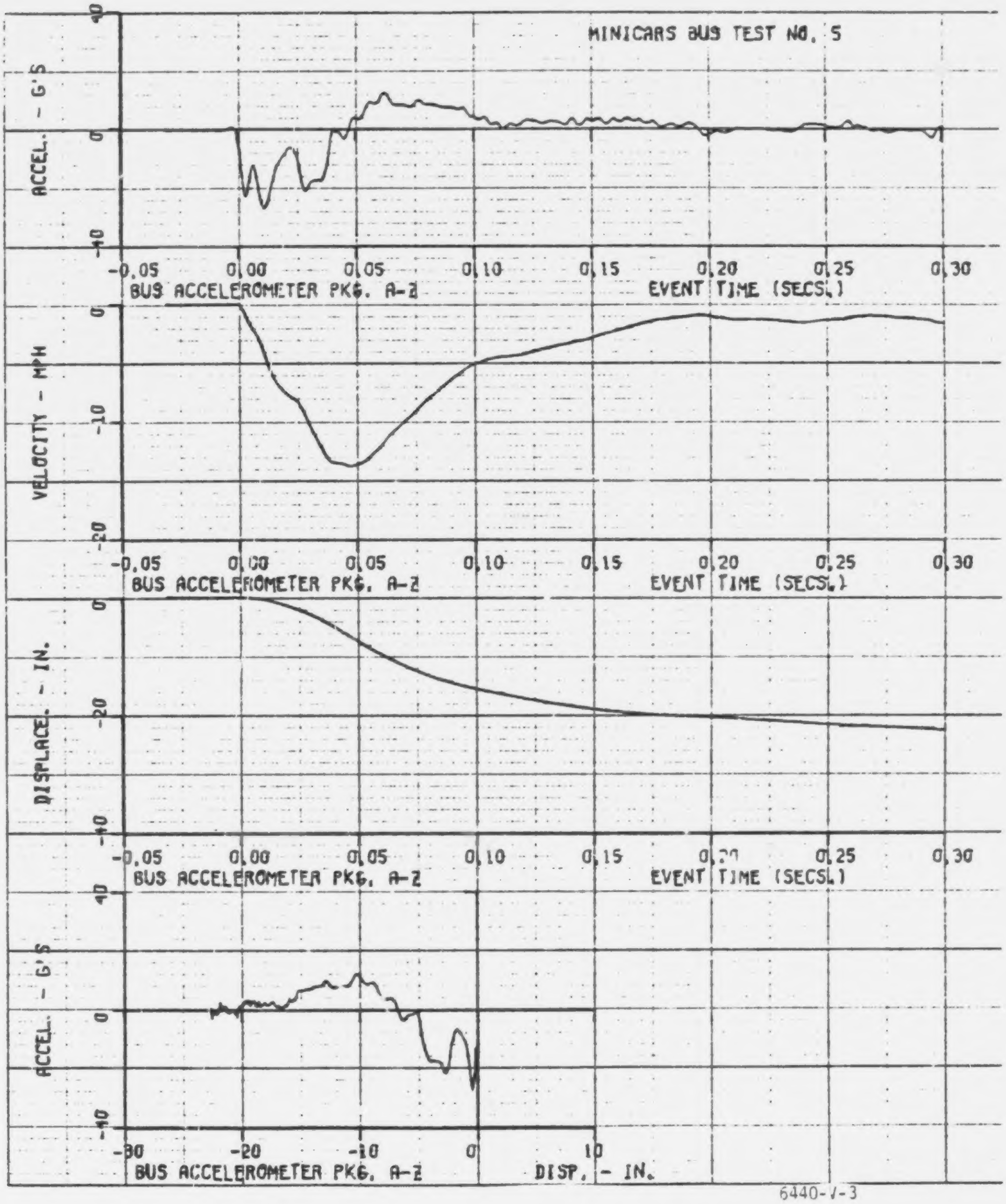

MINICARS BUS TEST NO. 5
ACCEL. - G'S
50
0
-50
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-Z
EVENT TIME (SECS.)
VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-Z
EVENT TIME (SECS.)
ACCEL. - G'S
50
0
-50
-2
-1
0
1
2
BUS ACCELEROMETER PKG. #4-Z
DISP. - IN.

6440-V-3

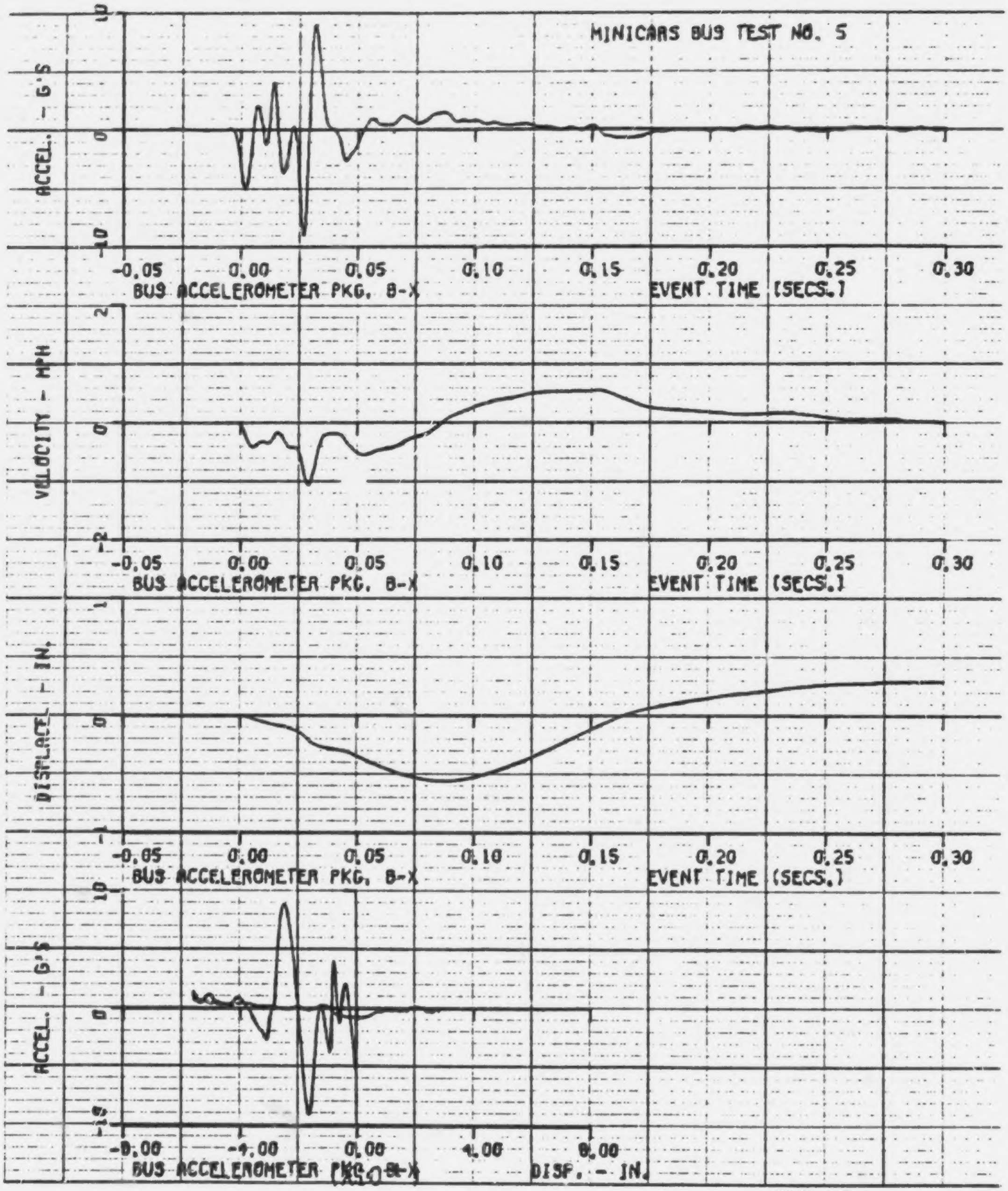
263


MINICARS BUS TEST NO. 5
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-X
EVENT TIME (SECS.)
VELOCITY - MPH
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-X
EVENT TIME (SECS.)
DISPLACE. - IN.
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-X
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-6
-4
-2
0
2
BUS ACCELEROMETER PKG. A-X
DISP. - IN.

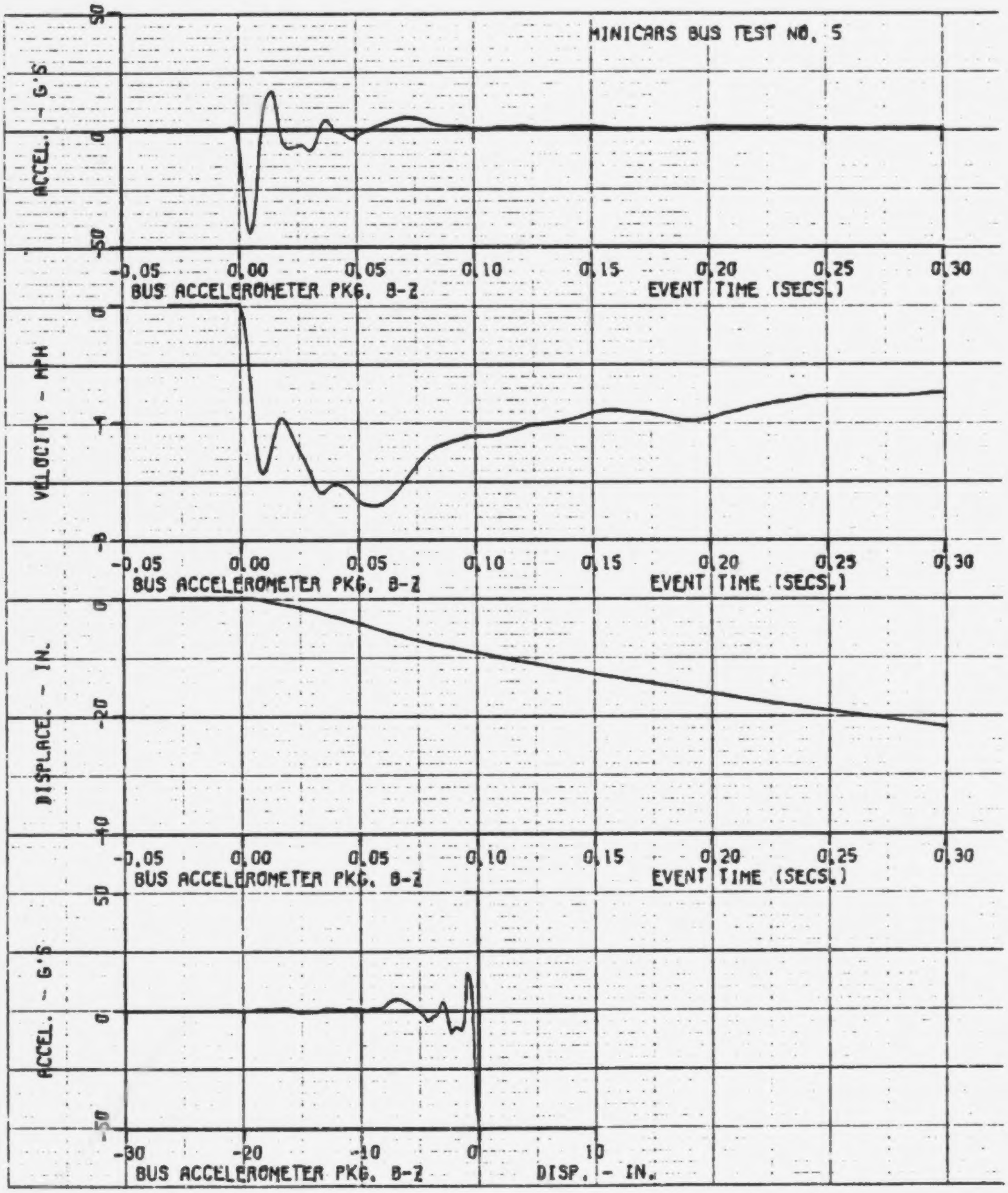
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-Z
EVENT TIME (SECS.)
VELOCITY - MPH
0
-10
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-20
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-Z
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
-30
-20
-10
0
10
BUS ACCELEROMETER PKG. A-Z
DISP. - IN.

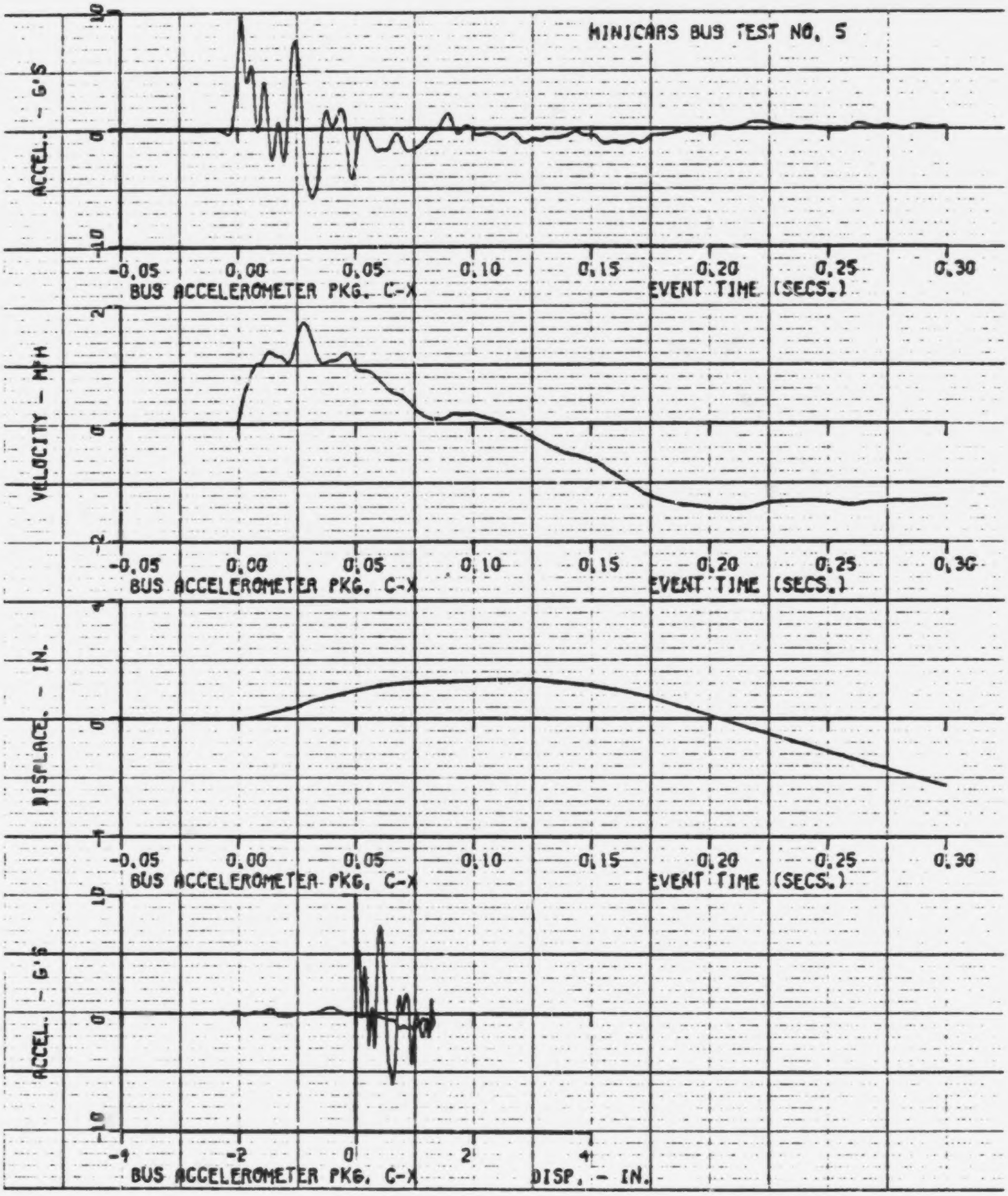
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. B-X
EVENT TIME (SECS.)
VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. B-X
EVENT TIME (SECS.)
DISPLACE. - IN.
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. B-X
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-8.00
-4.00
0.00
4.00
8.00
(X10)
BUS ACCELEROMETER PKG. B-X
DISP. - IN.

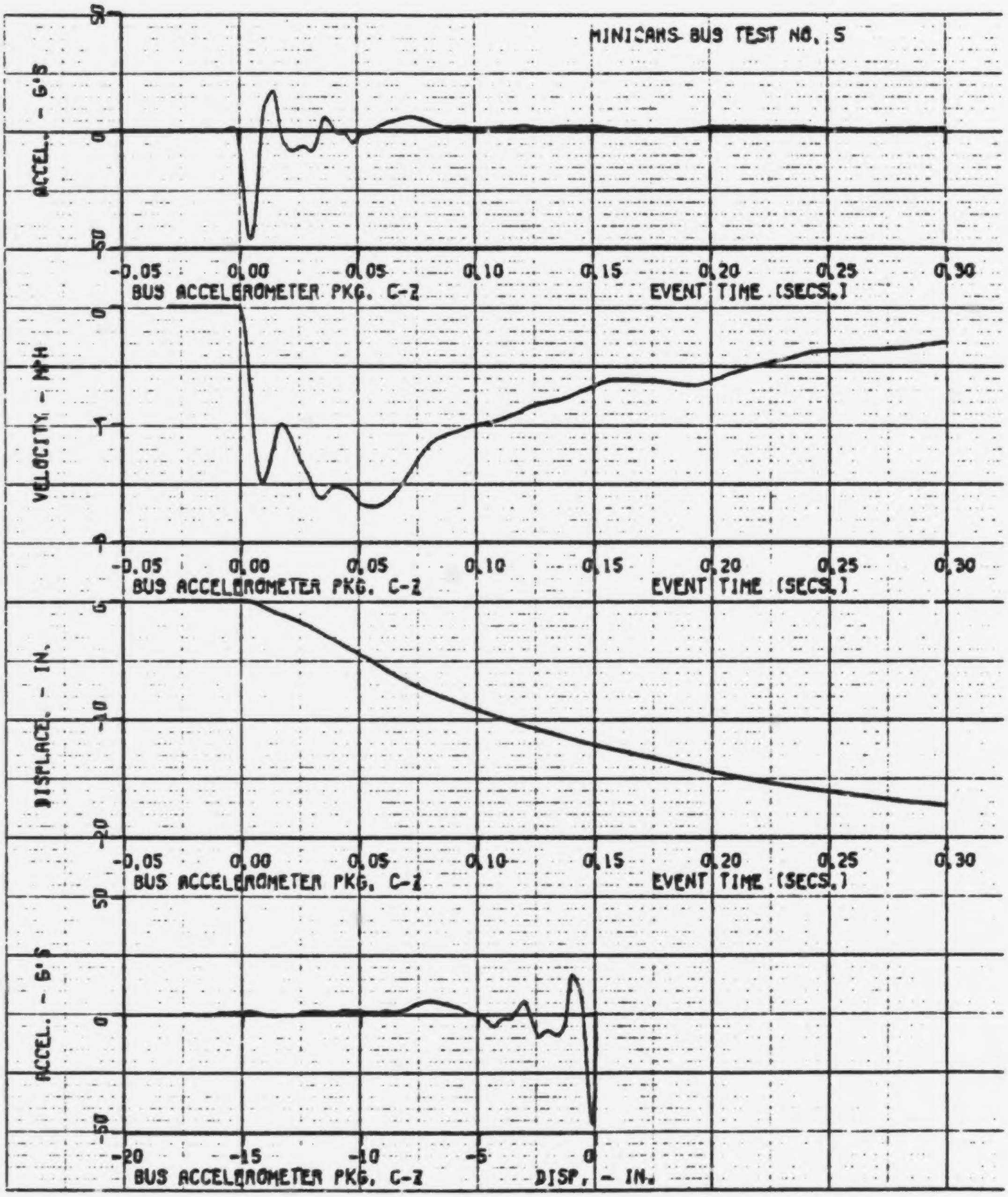
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
50
0
-50
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. B-Z
EVENT TIME (SECS.)
VELOCITY - MPH
0
-4
-8
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. B-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-20
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. B-Z
EVENT TIME (SECS.)
ACCEL. - G'S
50
0
-50
-30
-20
-10
0
10
BUS ACCELEROMETER PKG. B-Z
DISP. - IN.

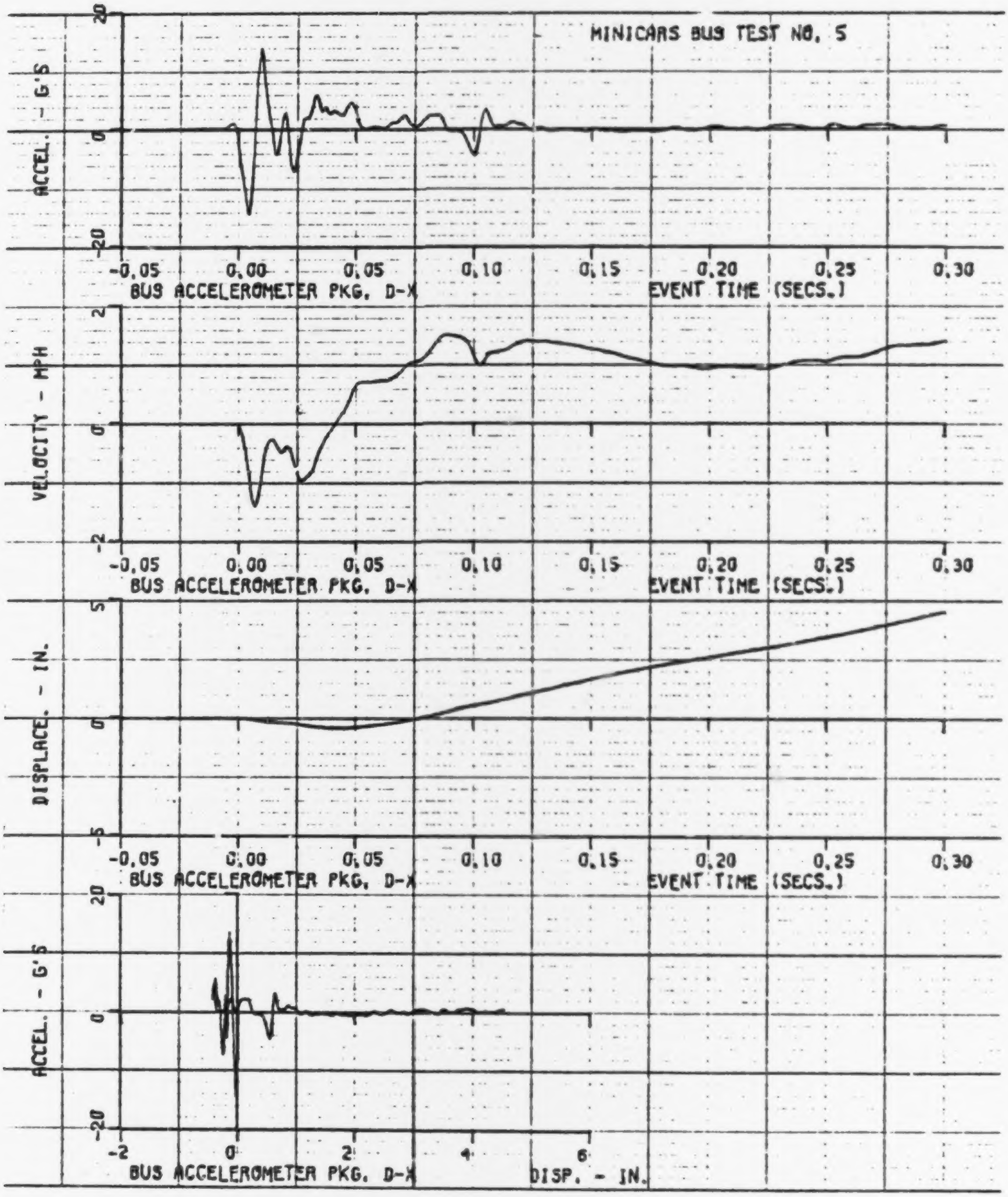
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-X
EVENT TIME (SECS.)
VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-X
EVENT TIME (SECS.)
DISPLACE. - IN.
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-X
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-4
-2
0
2
4
BUS ACCELEROMETER PKG. C-X
DISP. - IN.

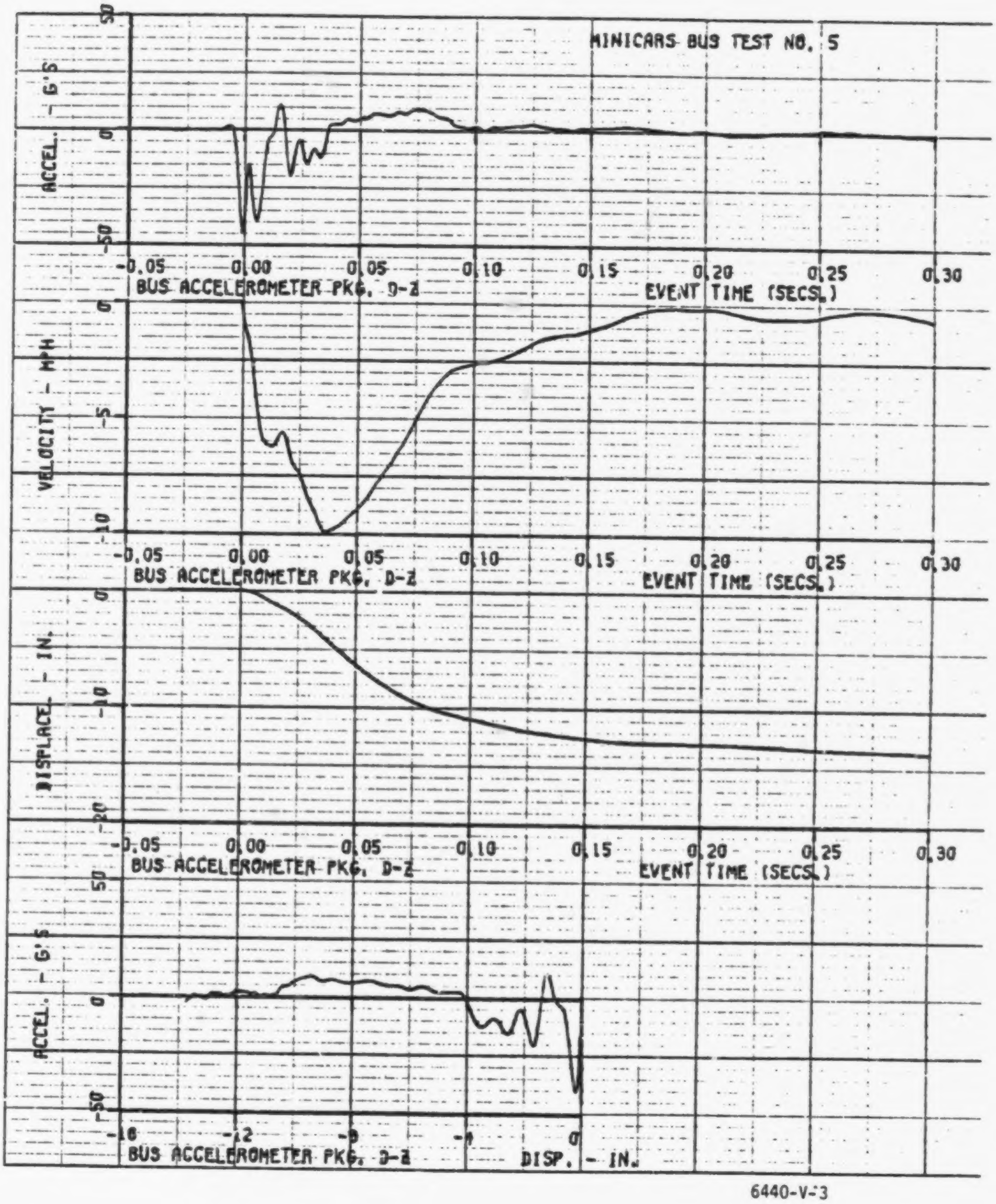
6440-V-3


MINICAMS BUS TEST NO. 5
ACCEL. - G'S
50
0
-50
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-Z
EVENT TIME (SECS.)
VELOCITY - MPH
0
-5
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-10
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-Z
EVENT TIME (SECS.)
ACCEL. - G'S
50
0
-50
-20
-15
-10
-5
0
BUS ACCELEROMETER PKG. C-Z
DISP. - IN.

6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. D-X
EVENT TIME (SECS.)
VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. D-X
EVENT TIME (SECS.)
DISPLACE. - IN.
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. D-X
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-2
0
2
4
6
BUS ACCELEROMETER PKG. D-X
DISP. - IN.

6440-V 3

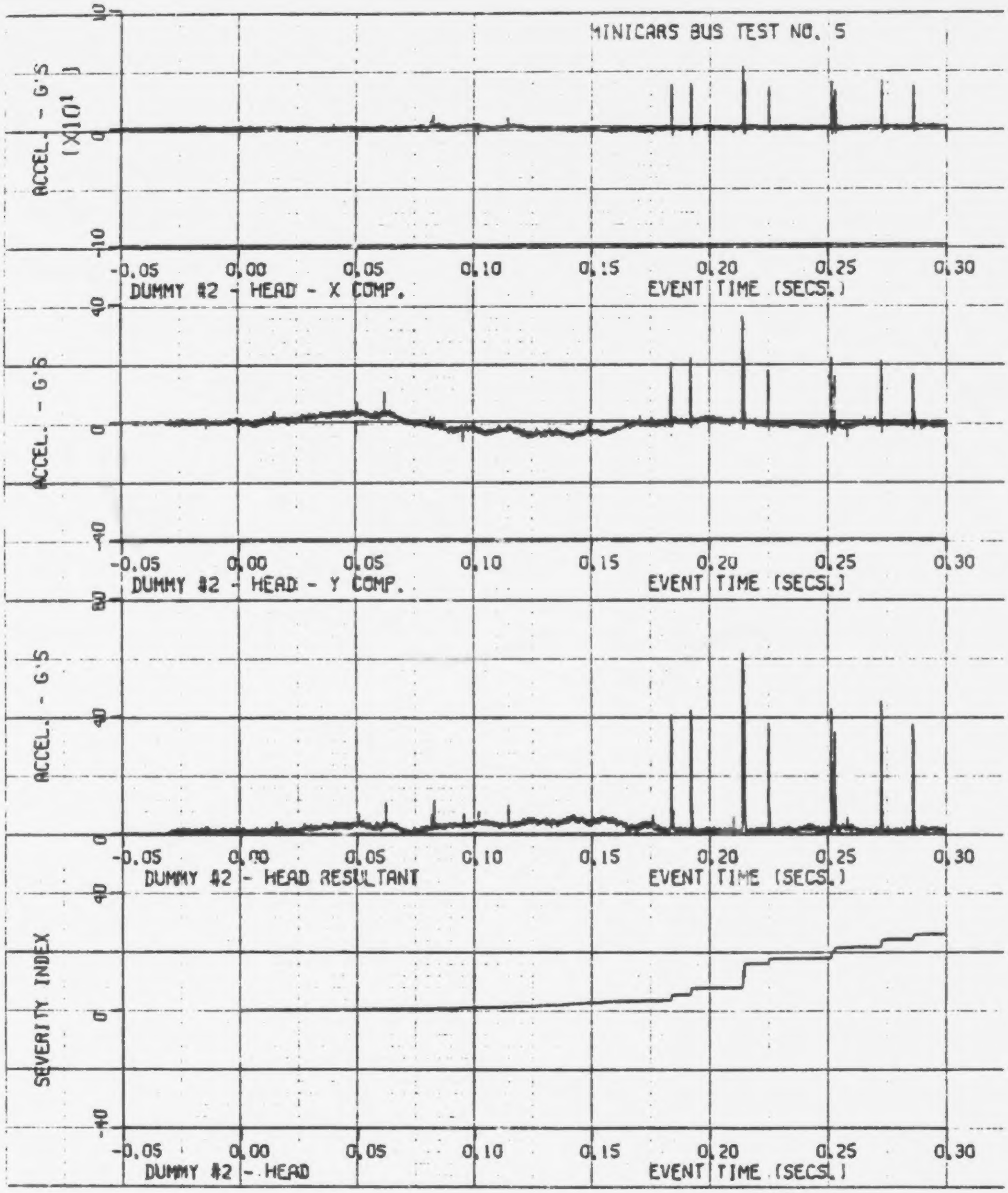

MINICARS BUS TEST NO. 5
ACCEL. - G'S
50
0
-50
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. D-Z
EVENT TIME (SECS.)
VELOCITY - MPH
0
-5
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. D-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-10
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. D-Z
EVENT TIME (SECS.)
ACCEL. - G'S
50
0
-50
-16
-12
-8
-4
0
BUS ACCELEROMETER PKG. D-Z
DISP. - IN.

6440-V-3

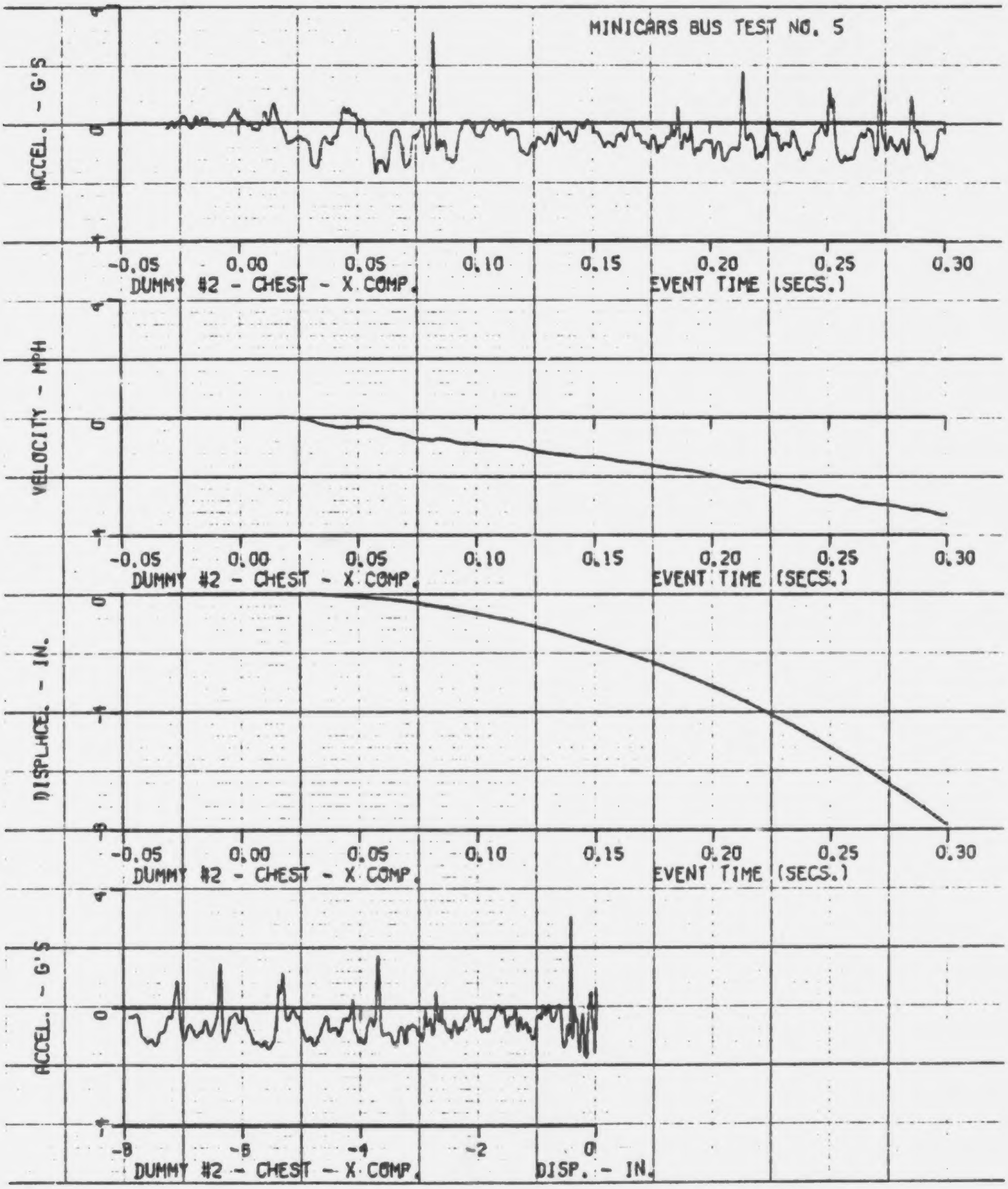
BLANK PAGE

DUMMY DATA

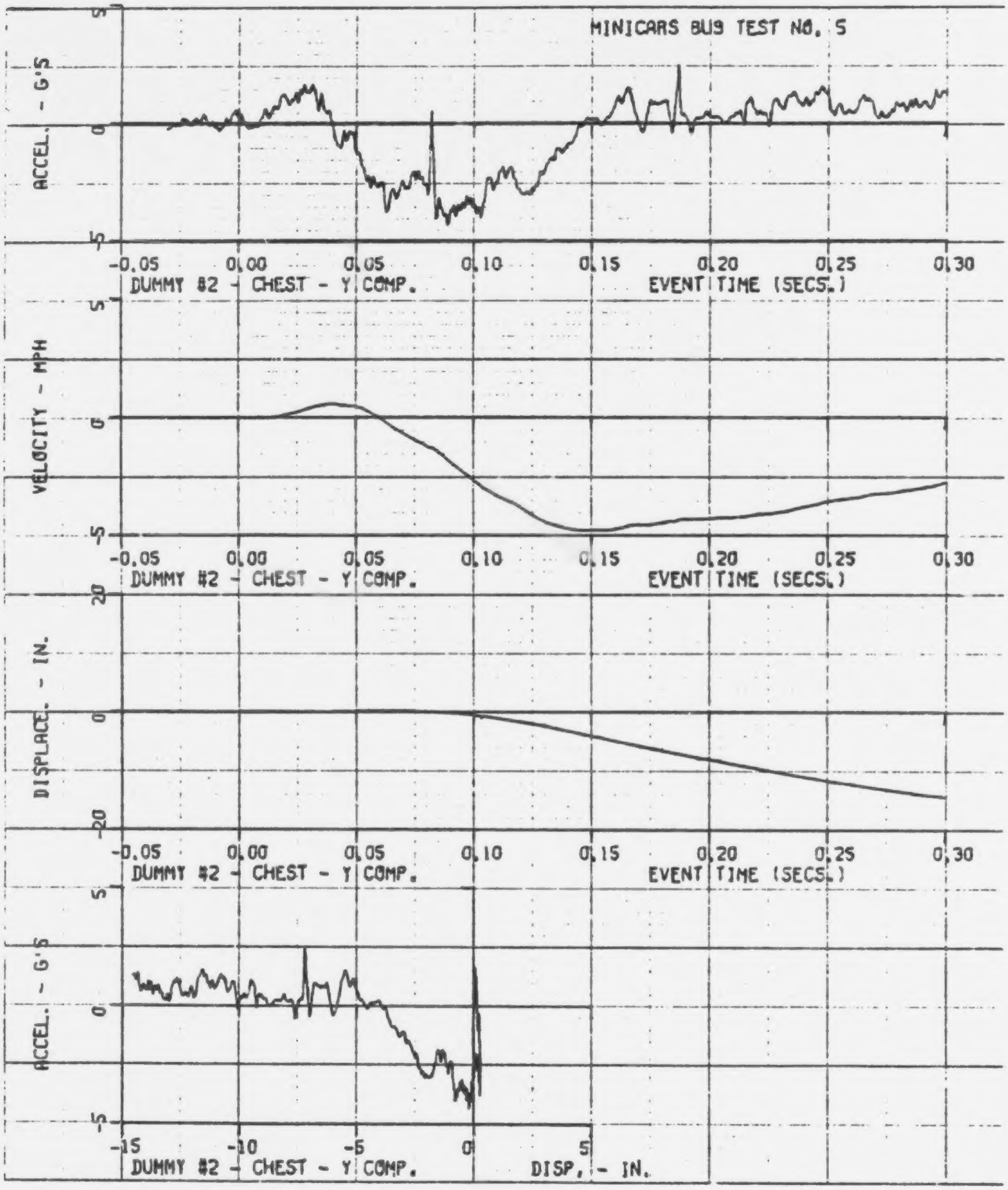
273


MINICARS BUS TEST NO. 5
ACCEL. - G'S (X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - HEAD - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
DUMMY #2 - HEAD - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
80
40
0
DUMMY #2 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
40
0
-40
DUMMY #2 - HEAD
EVENT TIME (SECS.)

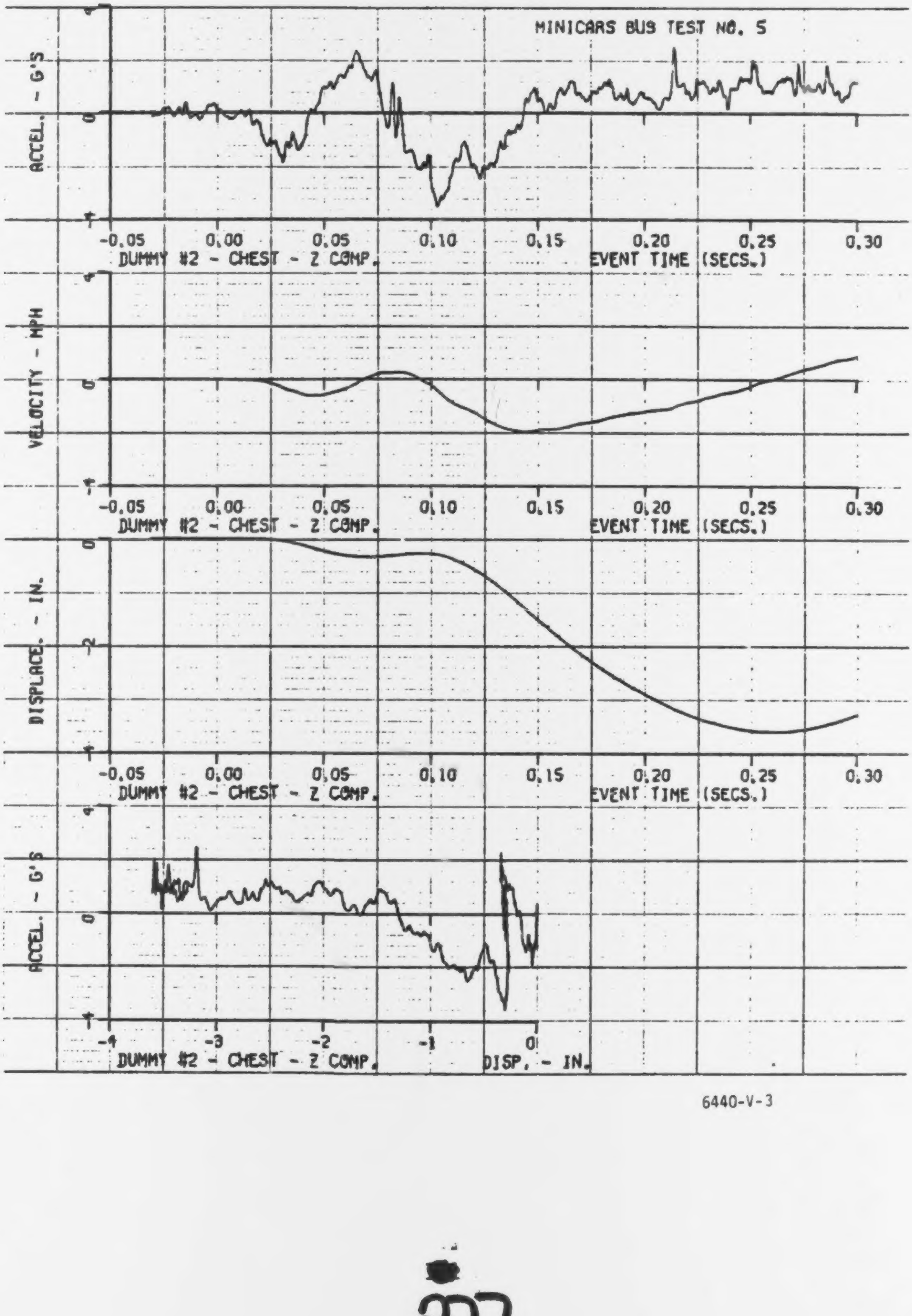
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - X COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - X COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-4
-8
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
4
0
-4
-8
-6
-4
-2
0
DUMMY #2 - CHEST - X COMP.
DISP. - IN.

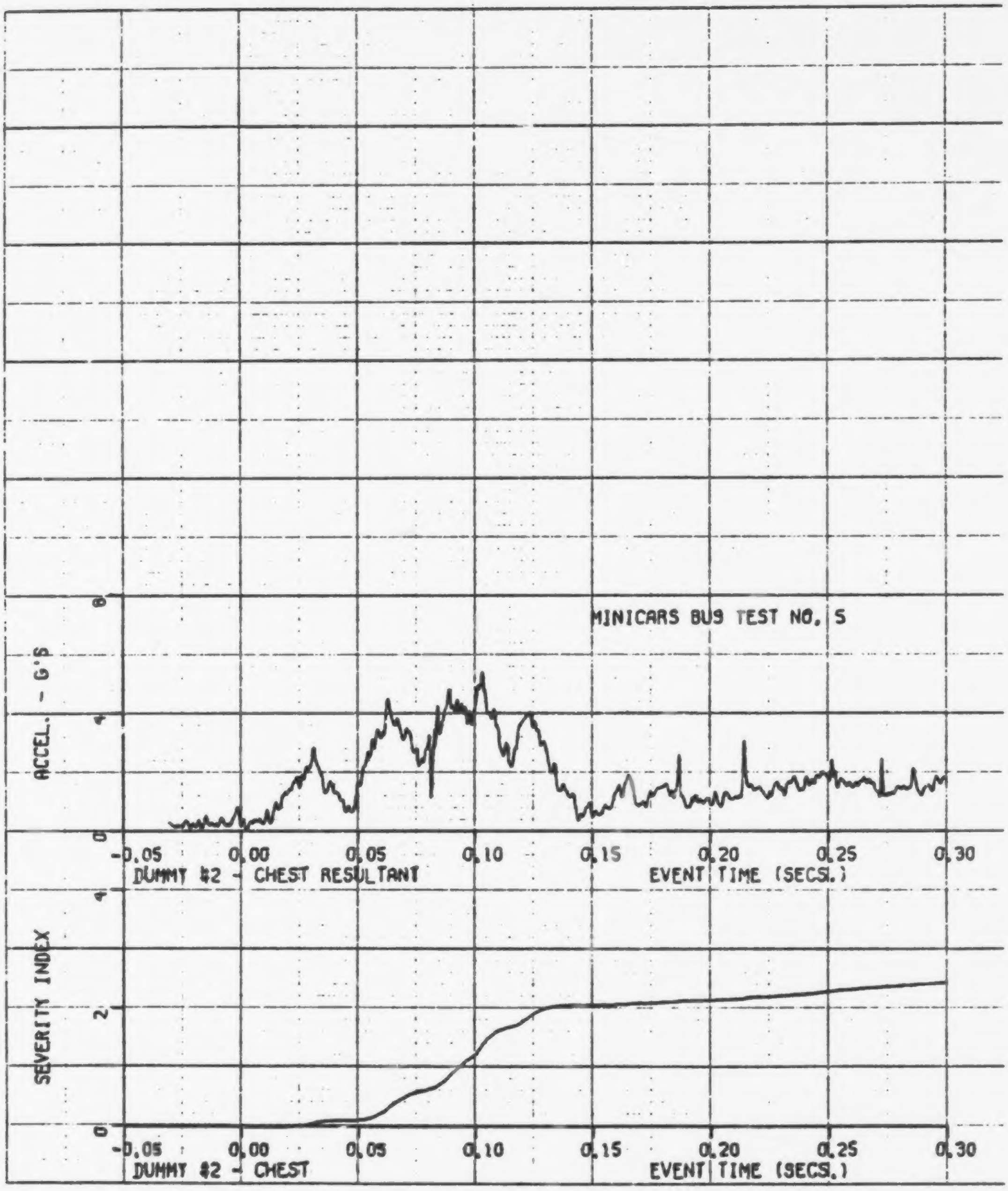
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - Y COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - Y COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
5
0
-5
-15
-10
-5
0
5
DUMMY #2 - CHEST - Y COMP.
DISP. - IN.

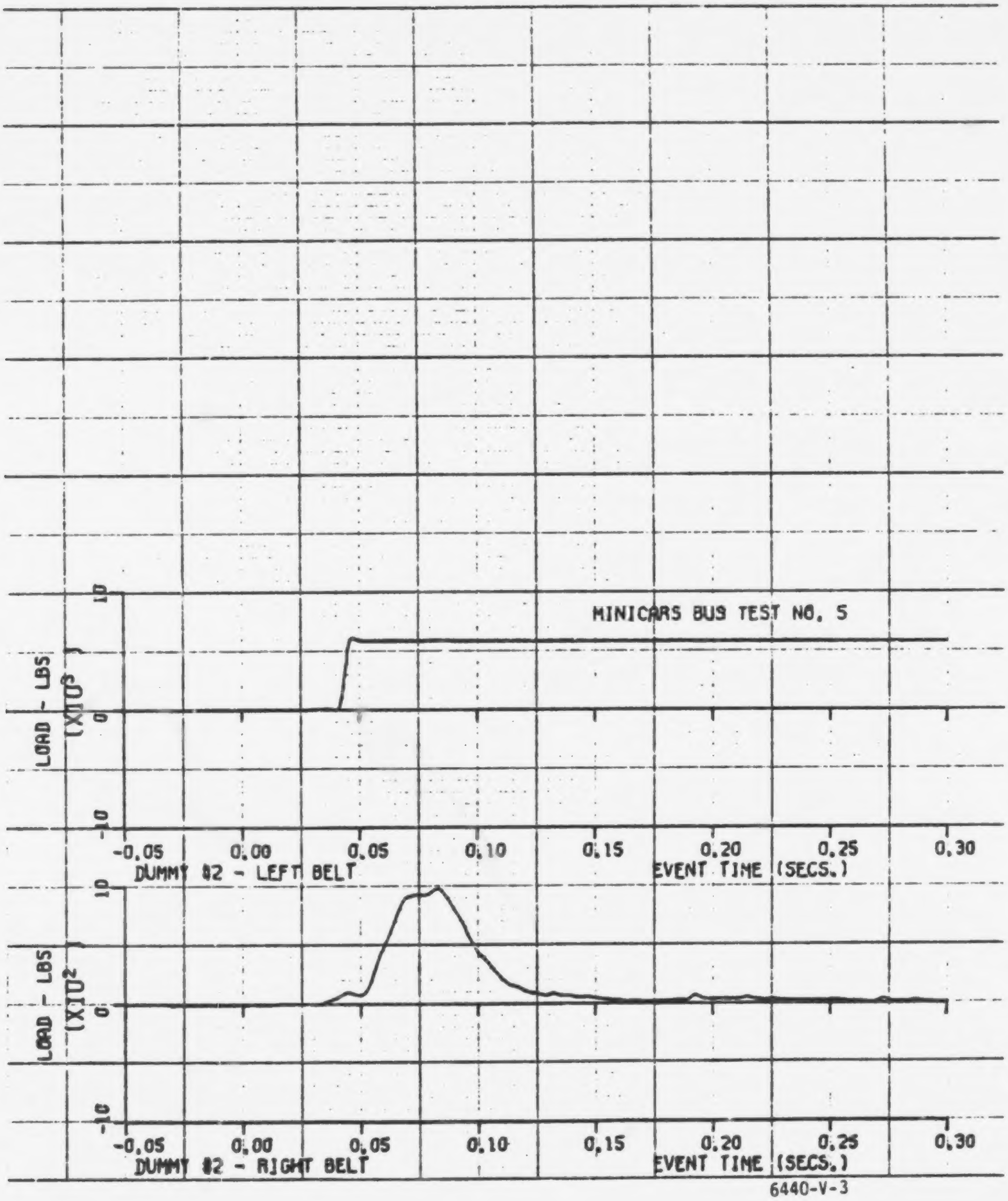
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - Z COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - Z COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-2
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - Z COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
4
0
-4
-4
-3
-2
-1
0
DUMMY #2 - CHEST - Z COMP.
DISP. - IN.

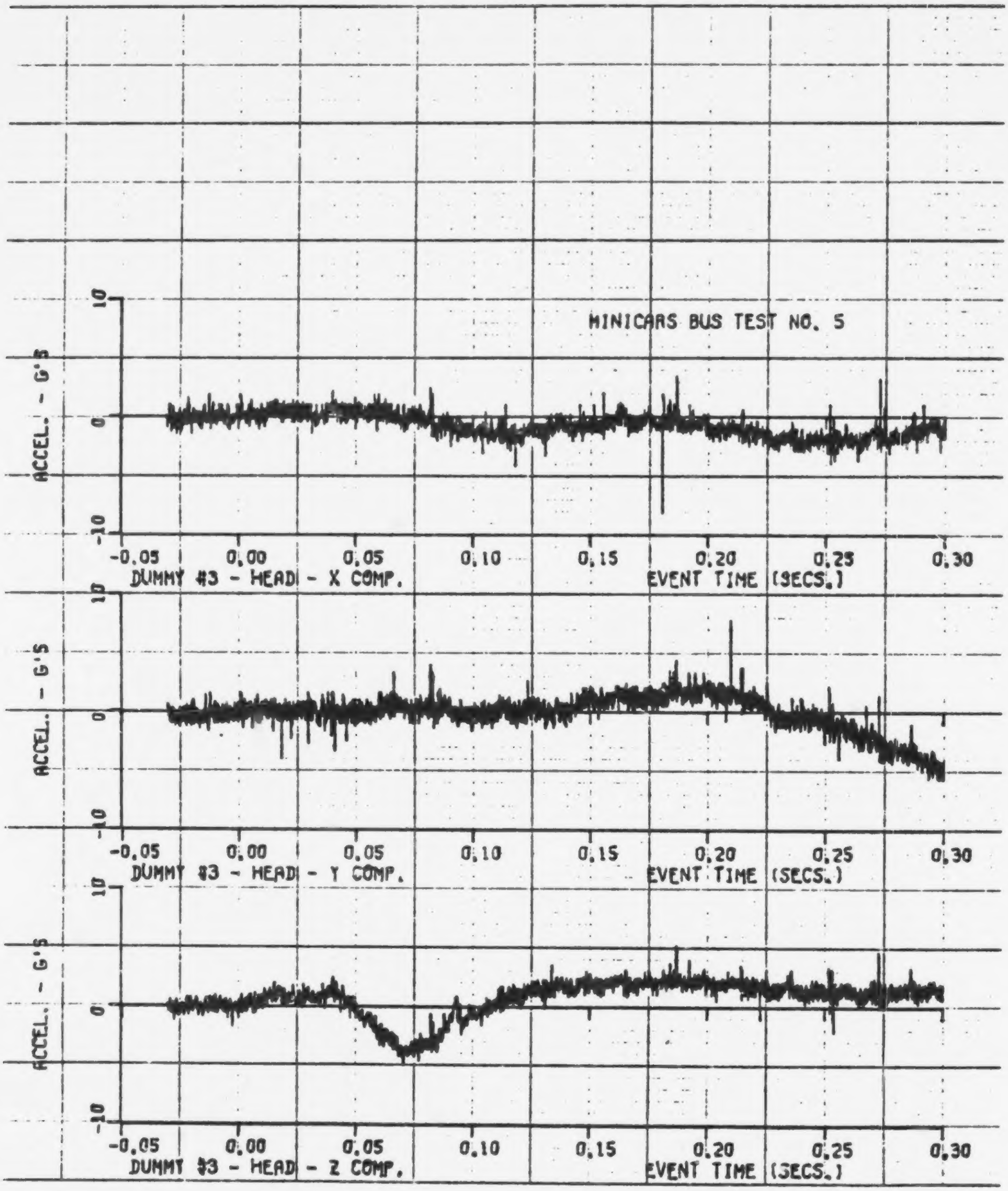
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
8
4
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
4
2
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST
EVENT TIME (SECS.)

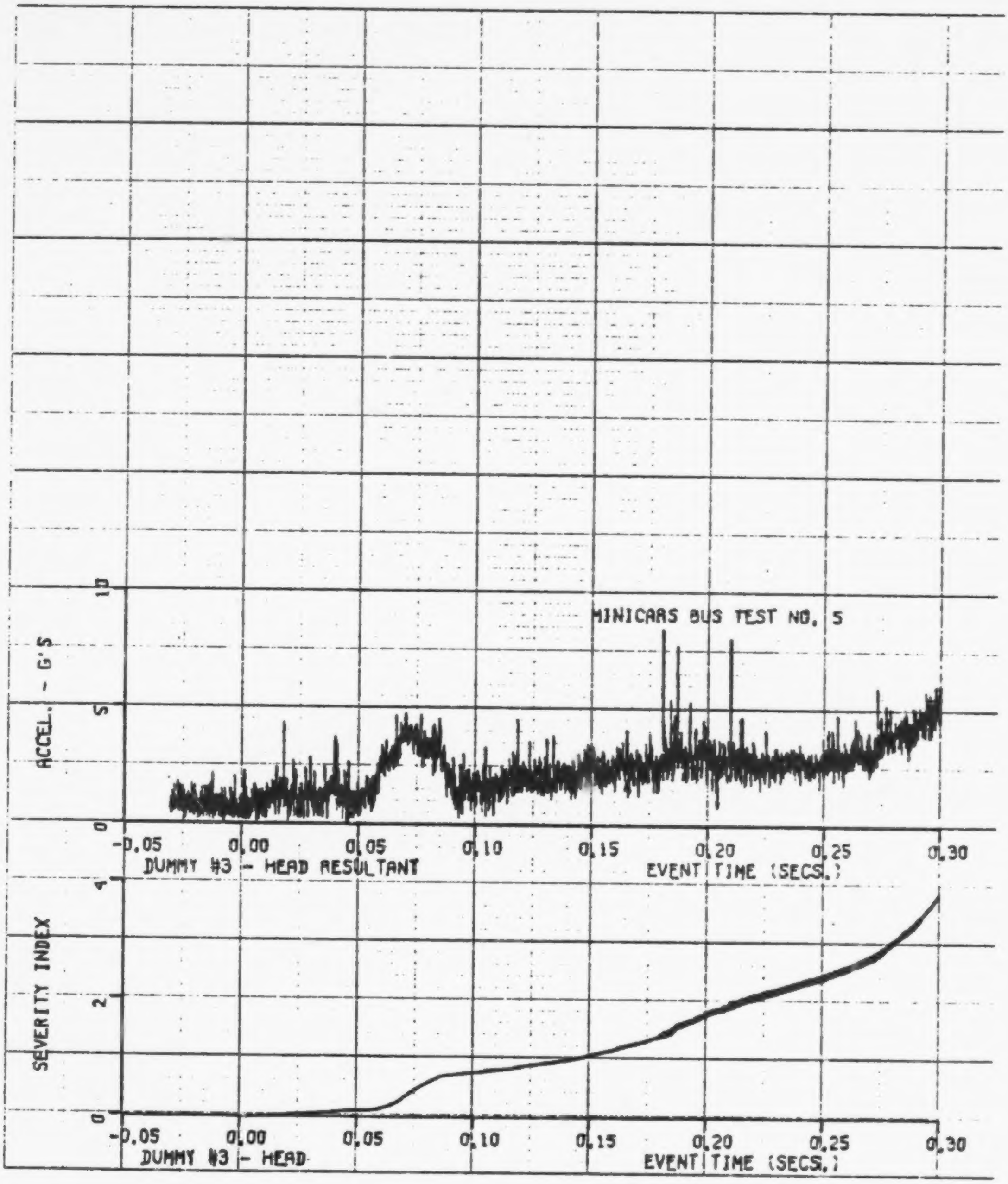
6440-V-3


MINICARS BUS TEST NO. 5
LOAD - LBS
(X10^3)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - LEFT BELT
EVENT TIME (SECS.)
LOAD - LBS
(X10^2)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - RIGHT BELT
EVENT TIME (SECS.)

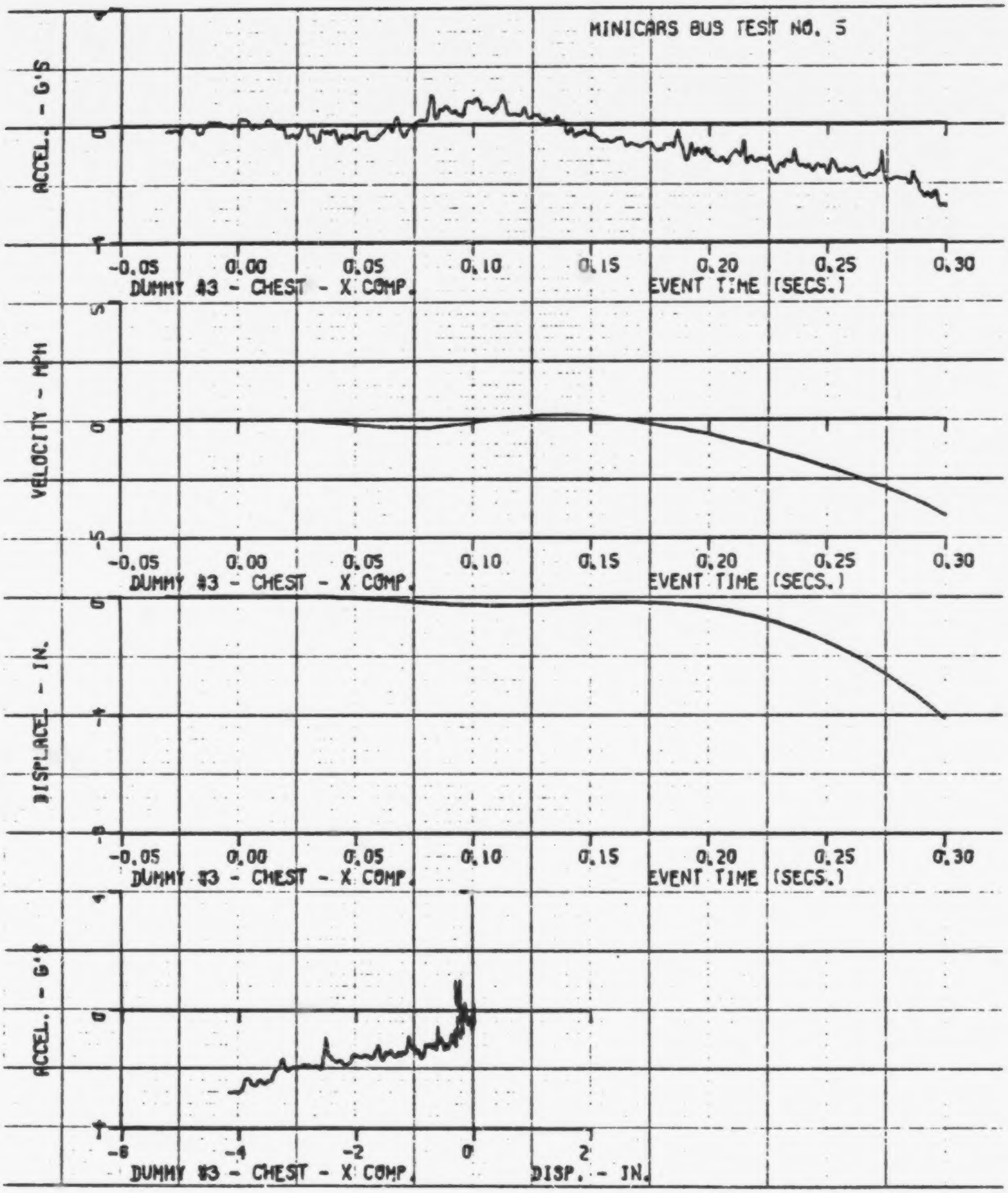
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - HEAD - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - HEAD - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - HEAD - Z COMP.
EVENT TIME (SECS.)

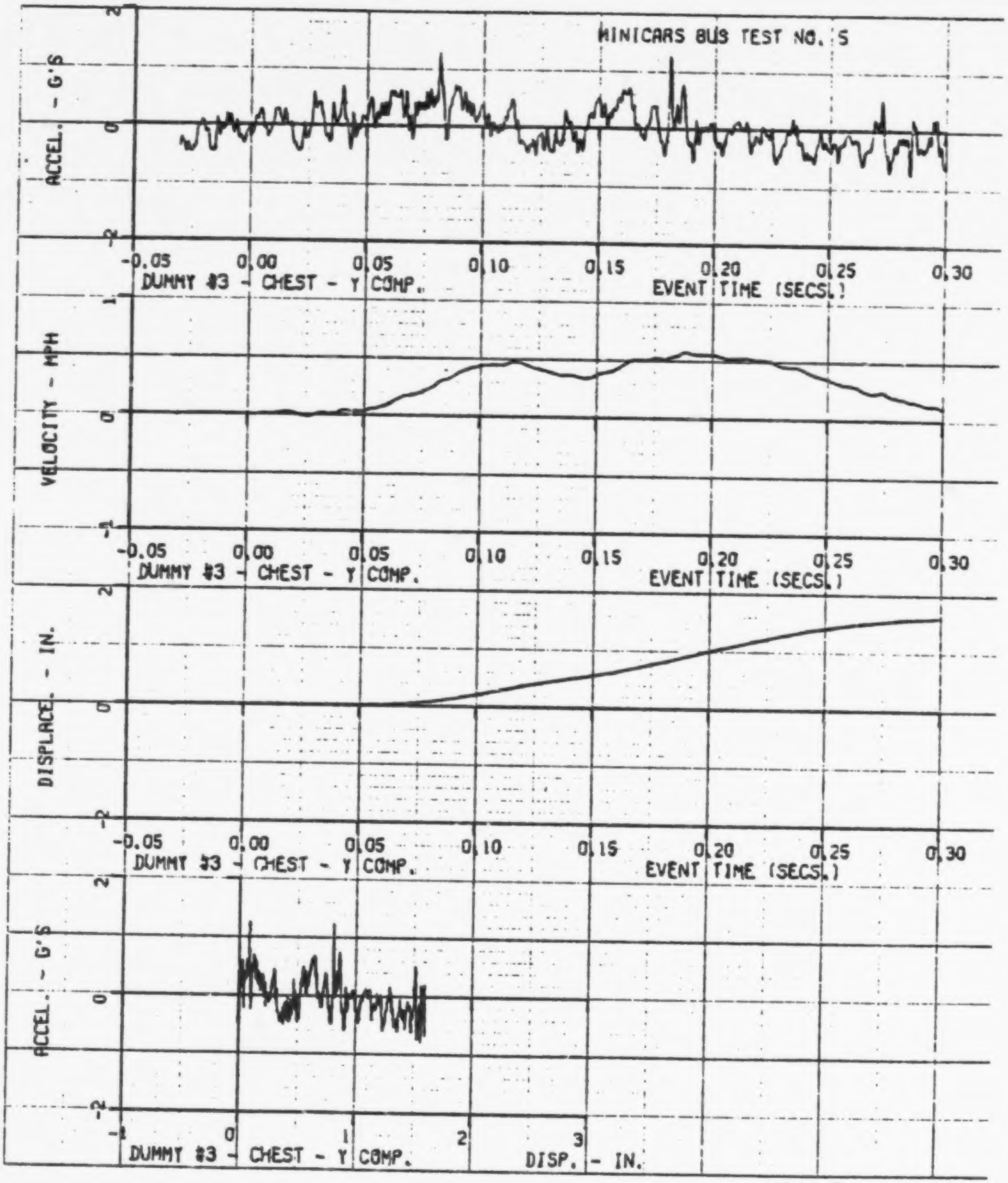
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
0
5
10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
0
2
4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - HEAD
EVENT TIME (SECS.)

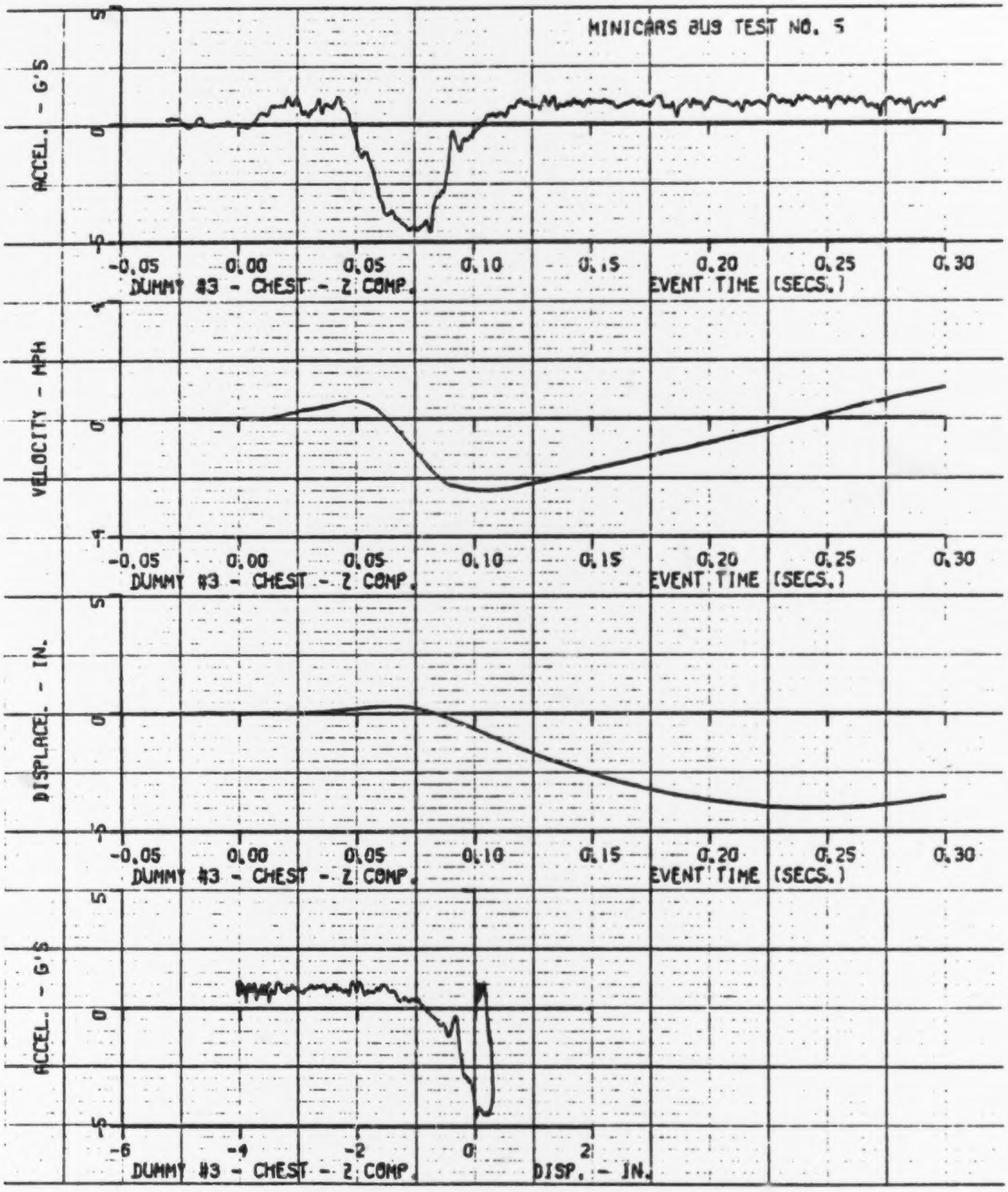
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - X COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - X COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-4
-8
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
4
0
-4
-6
-4
-2
0
2
DUMMY #3 - CHEST - X COMP.
DISP. - IN.

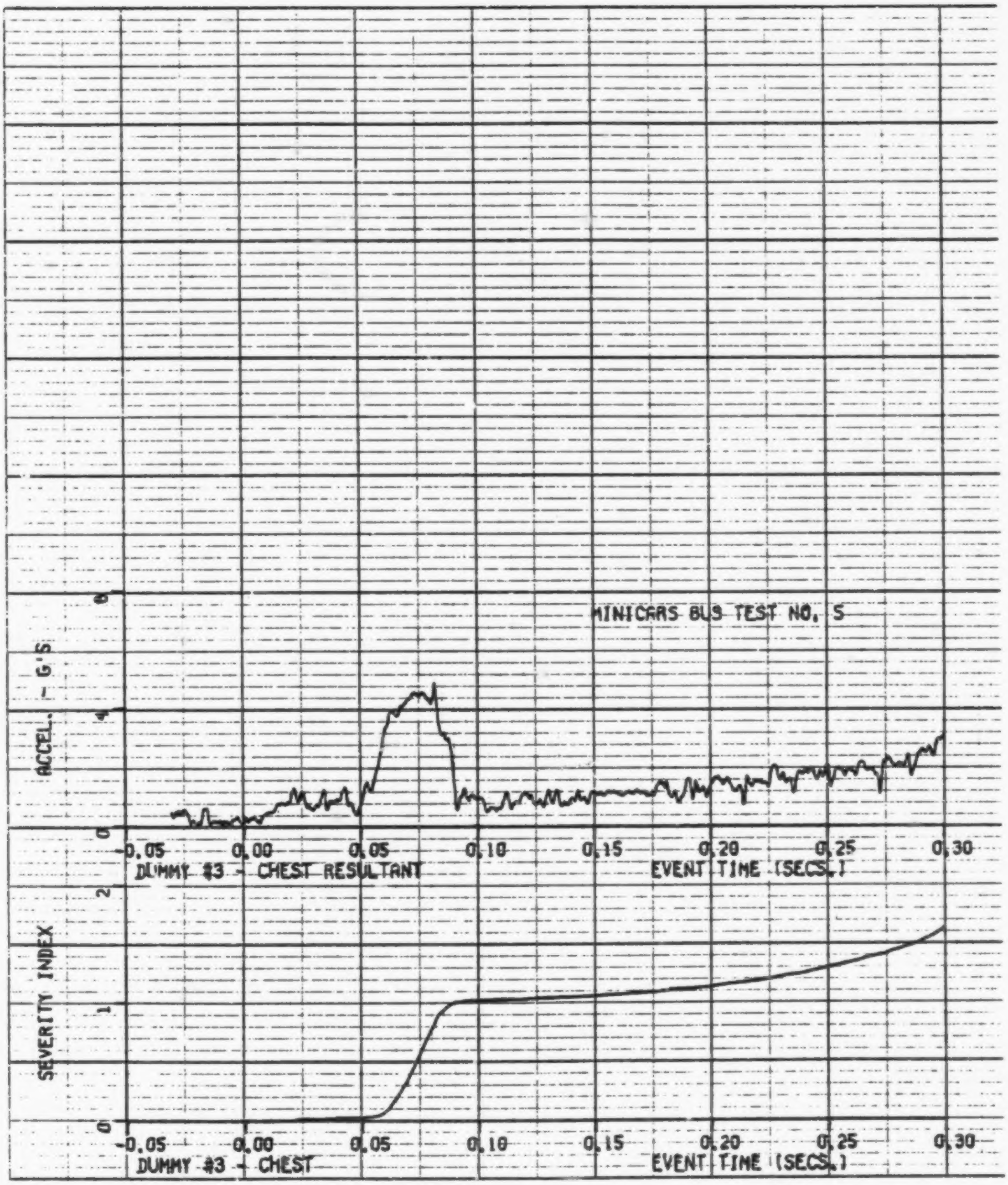
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - Y COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - Y COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
2
0
-2
-1
0
1
2
3
DUMMY #3 - CHEST - Y COMP.
DISP. - IN.

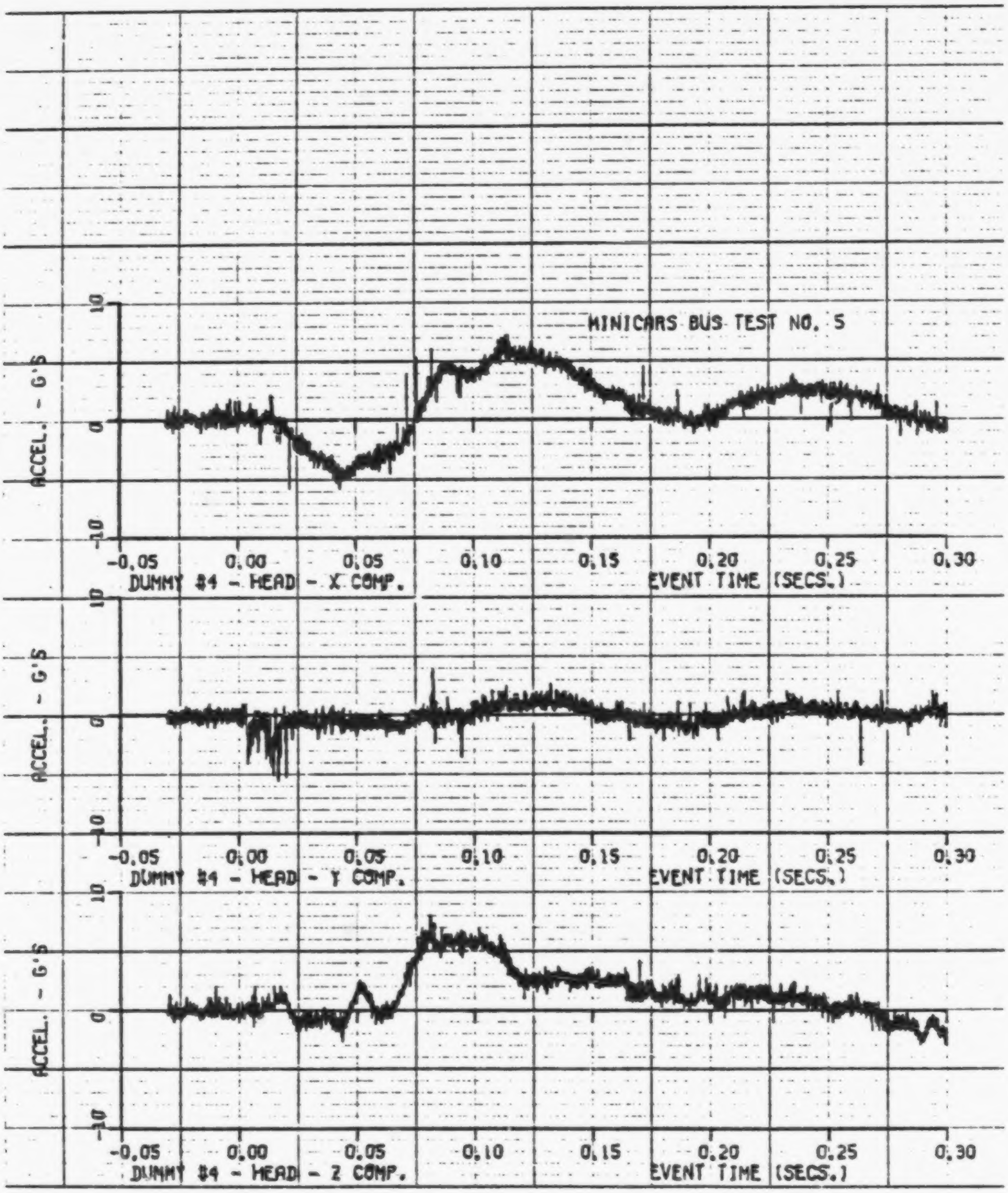
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - Z COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - Z COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - Z COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
5
0
-5
-6
-4
-2
0
2
DUMMY #3 - CHEST - Z COMP.
DISP. - IN.

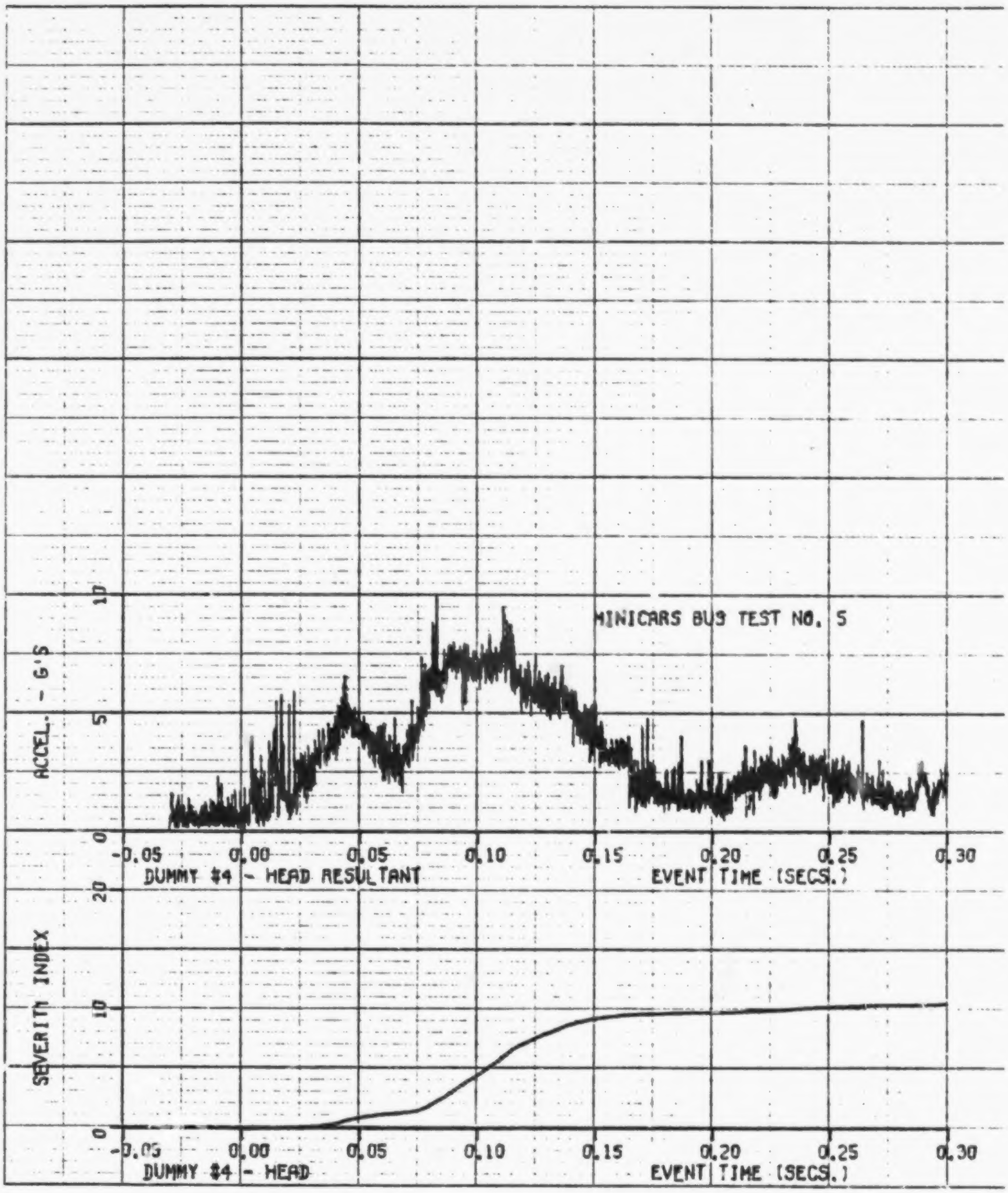
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
0
4
8
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
0
1
2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST
EVENT TIME (SECS.)

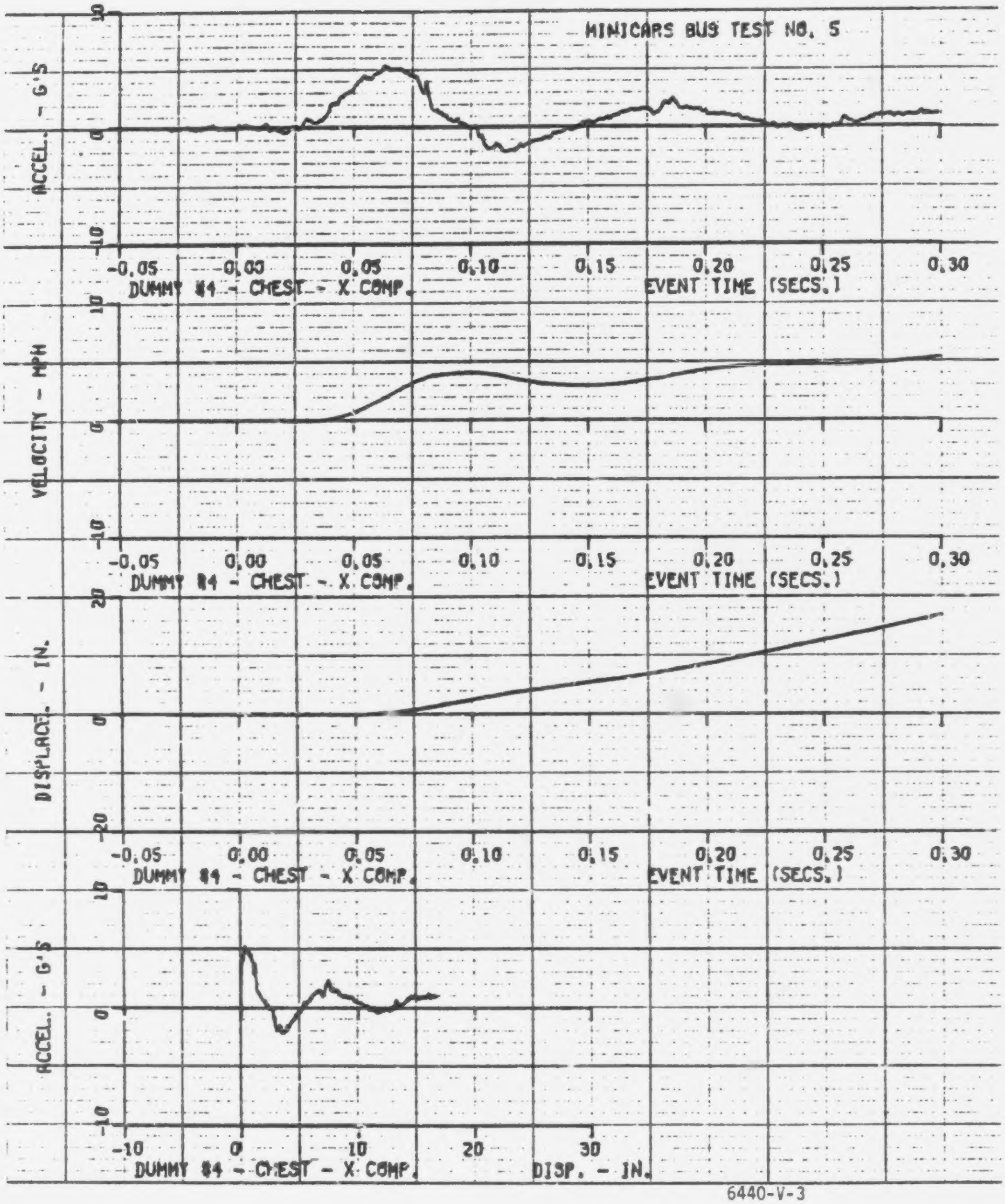
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - HEAD - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - HEAD - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - HEAD - Z COMP.
EVENT TIME (SECS.)

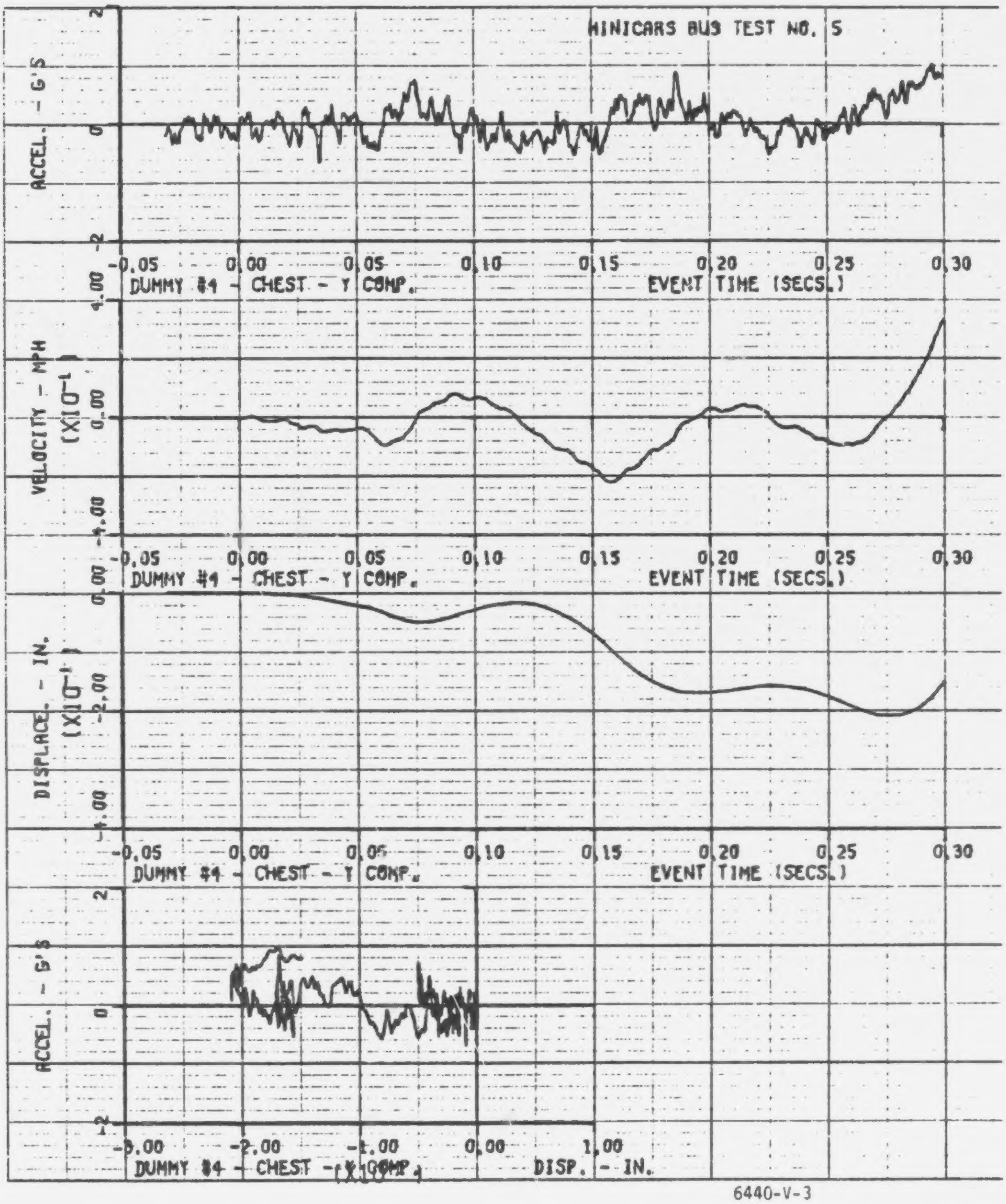
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
10
5
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - HEAD
EVENT TIME (SECS.)

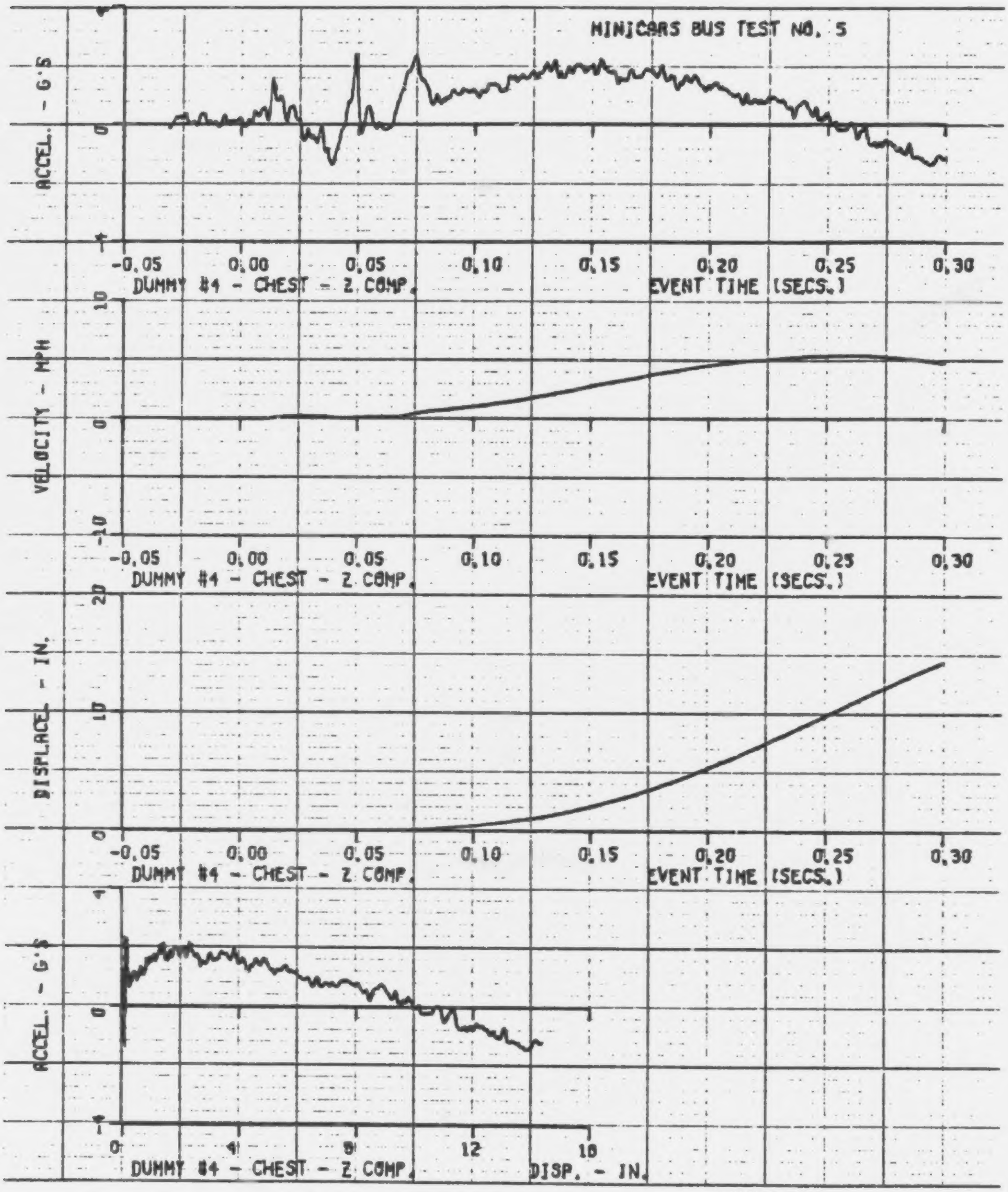
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - X COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - X COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-10
0
10
20
30
DUMMY #4 - CHEST - X COMP.
DISP. - IN.

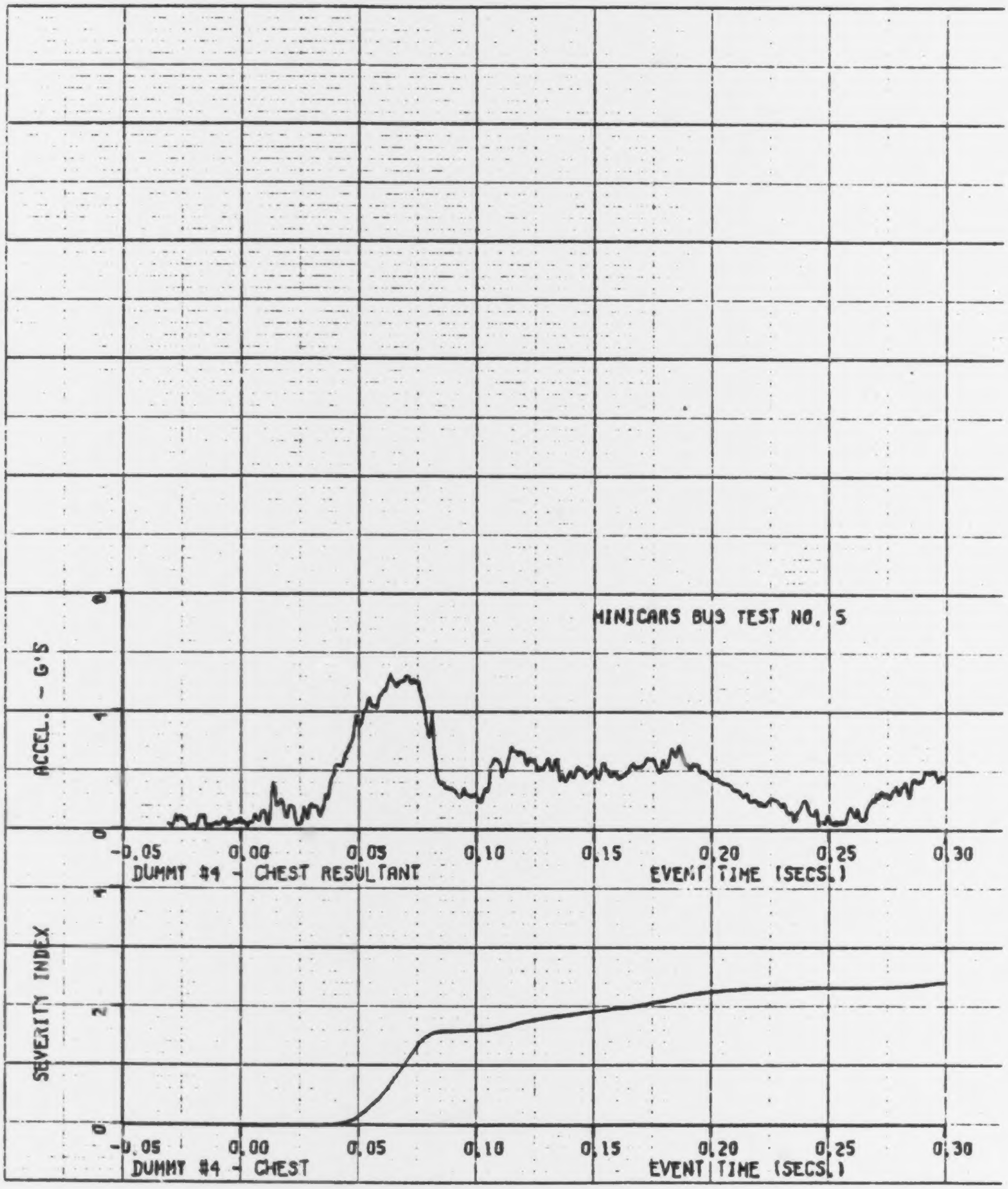
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Y COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
(X10^-1)
4.00
0.00
-4.00
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Y COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
(X10^-1)
0.00
-2.00
-4.00
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
2
0
-2
-3.00
-2.00
-1.00
0.00
1.00
DUMMY #4 - CHEST - Y COMP.
(X10^-1)
DISP. - IN.

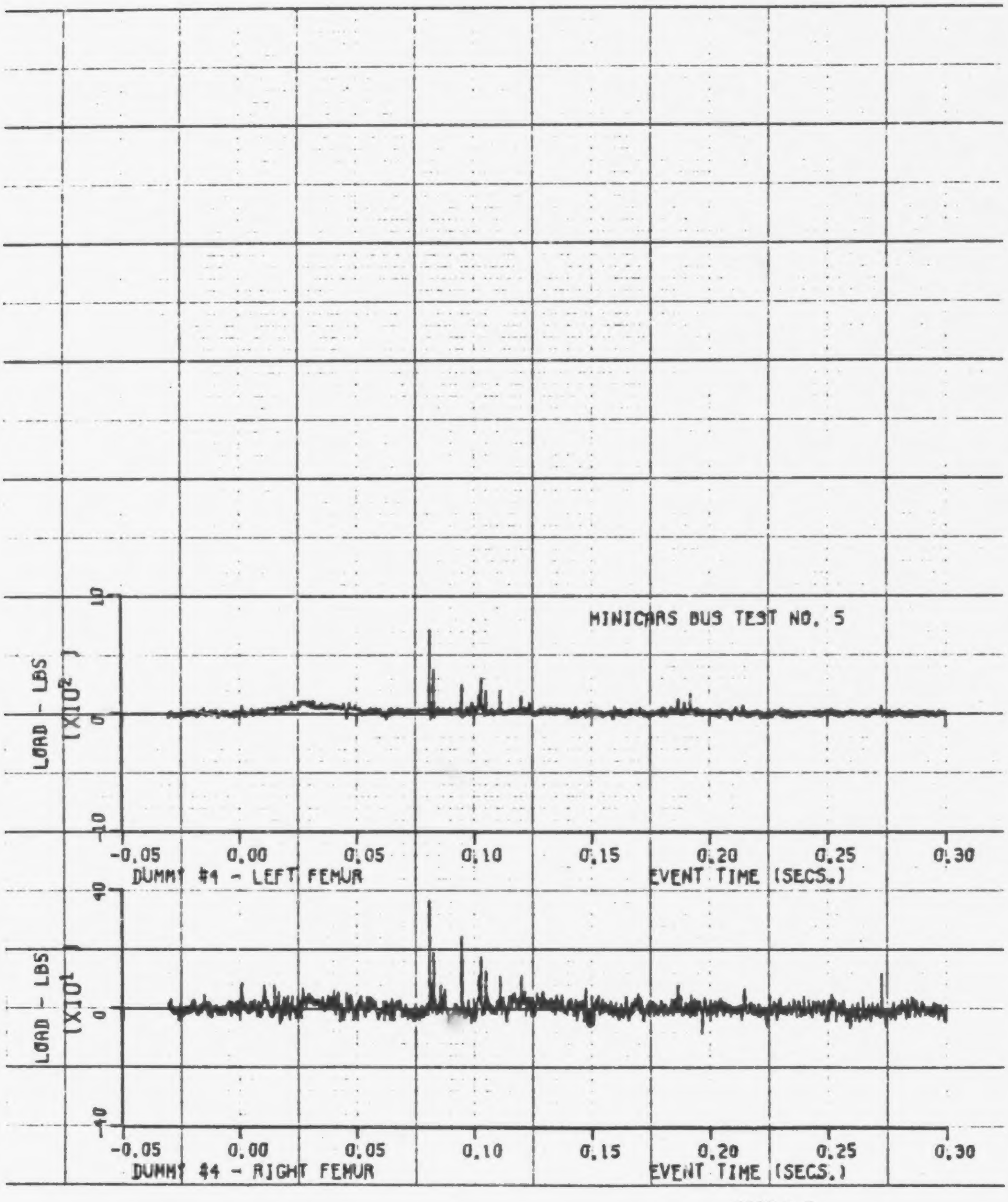
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Z COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Z COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Z COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
4
0
-4
0
4
8
12
16
DUMMY #4 - CHEST - Z COMP.
DISP. - IN.

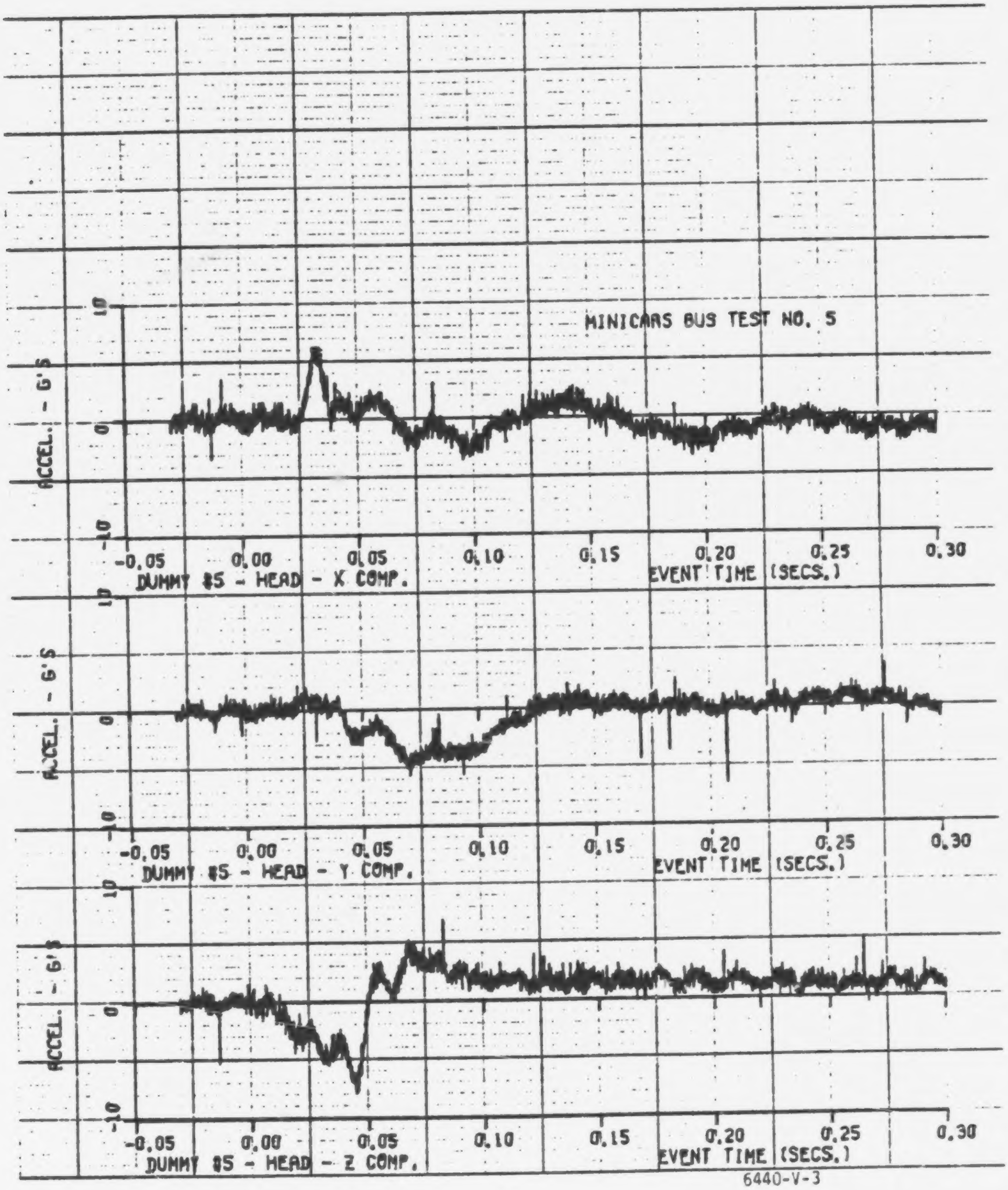
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
8
4
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
4
2
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST
EVENT TIME (SECS.)

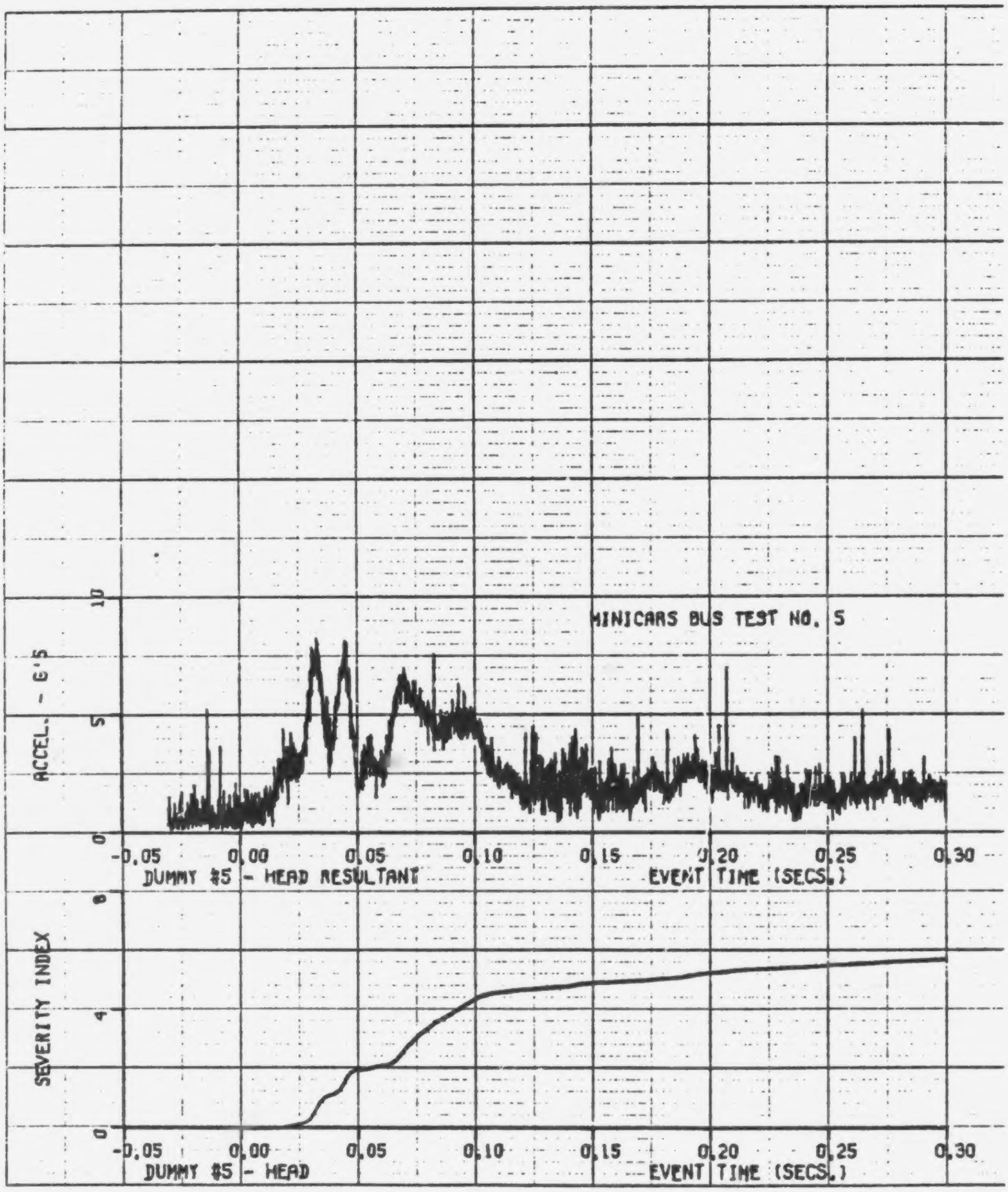
6440-V-3


MINICARS BUS TEST NO. 5
LOAD - LBS
(X10²)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - LEFT FEMUR
EVENT TIME (SECS.)
LOAD - LBS
(X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - RIGHT FEMUR
EVENT TIME (SECS.)

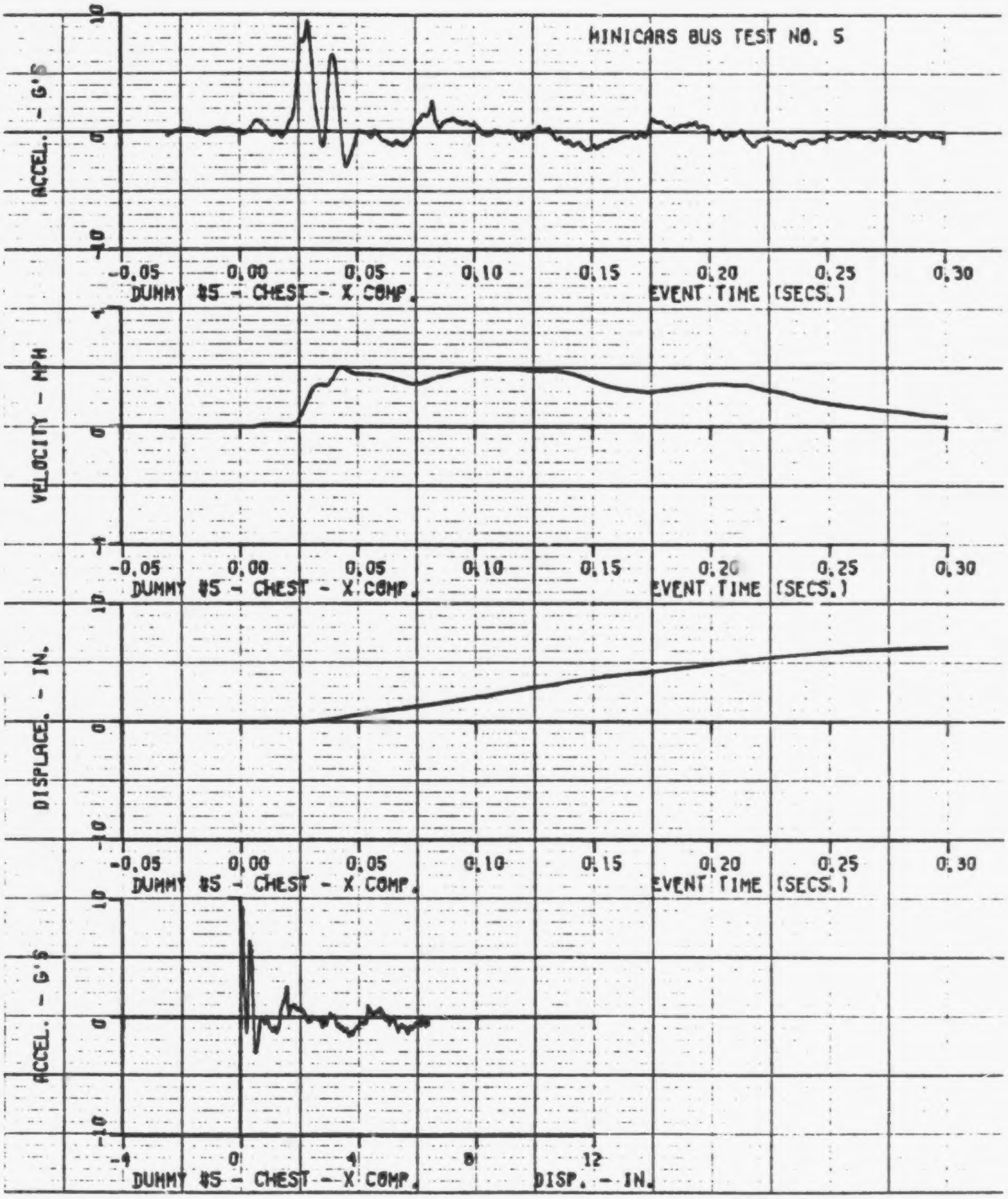
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - HEAD - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - HEAD - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - HEAD - Z COMP.
EVENT TIME (SECS.)

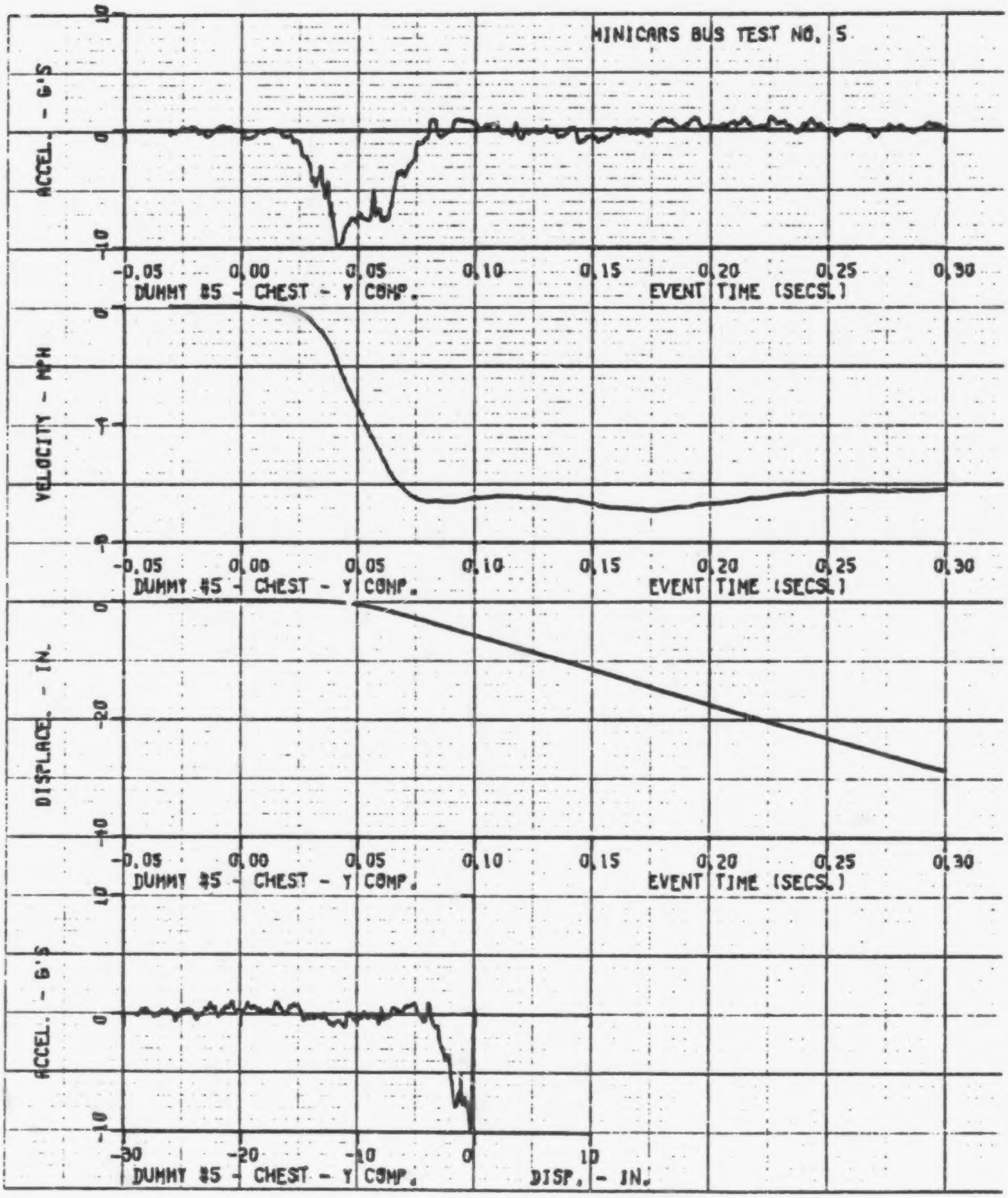
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
10
5
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
8
4
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - HEAD
EVENT TIME (SECS.)

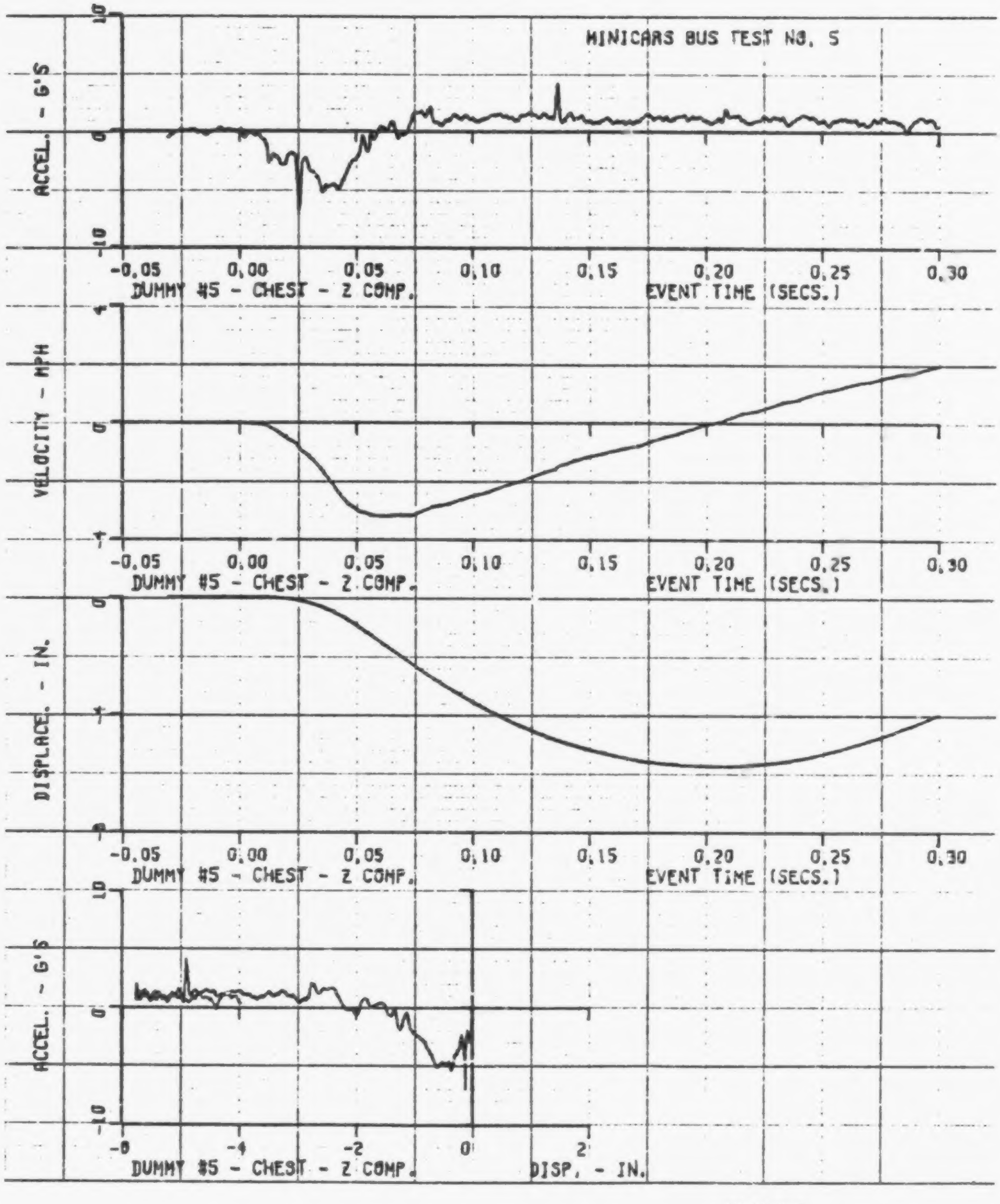
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - X COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - X COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-4
0
4
8
12
DUMMY #5 - CHEST - X COMP.
DISP. - IN.

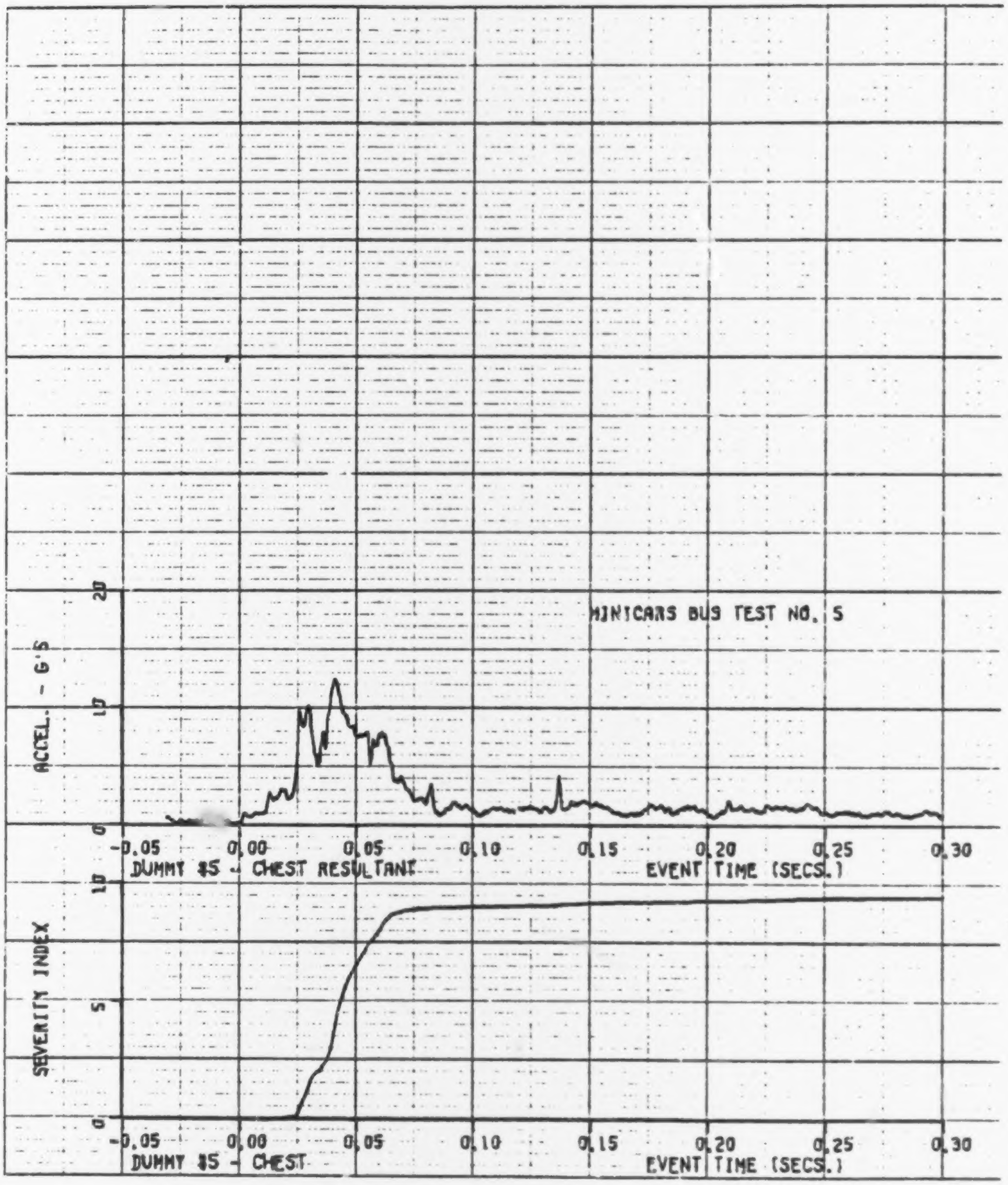
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Y COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
0
-4
-8
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Y COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-20
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-30
-20
-10
0
10
DUMMY #5 - CHEST - Y COMP.
DISP. - IN.

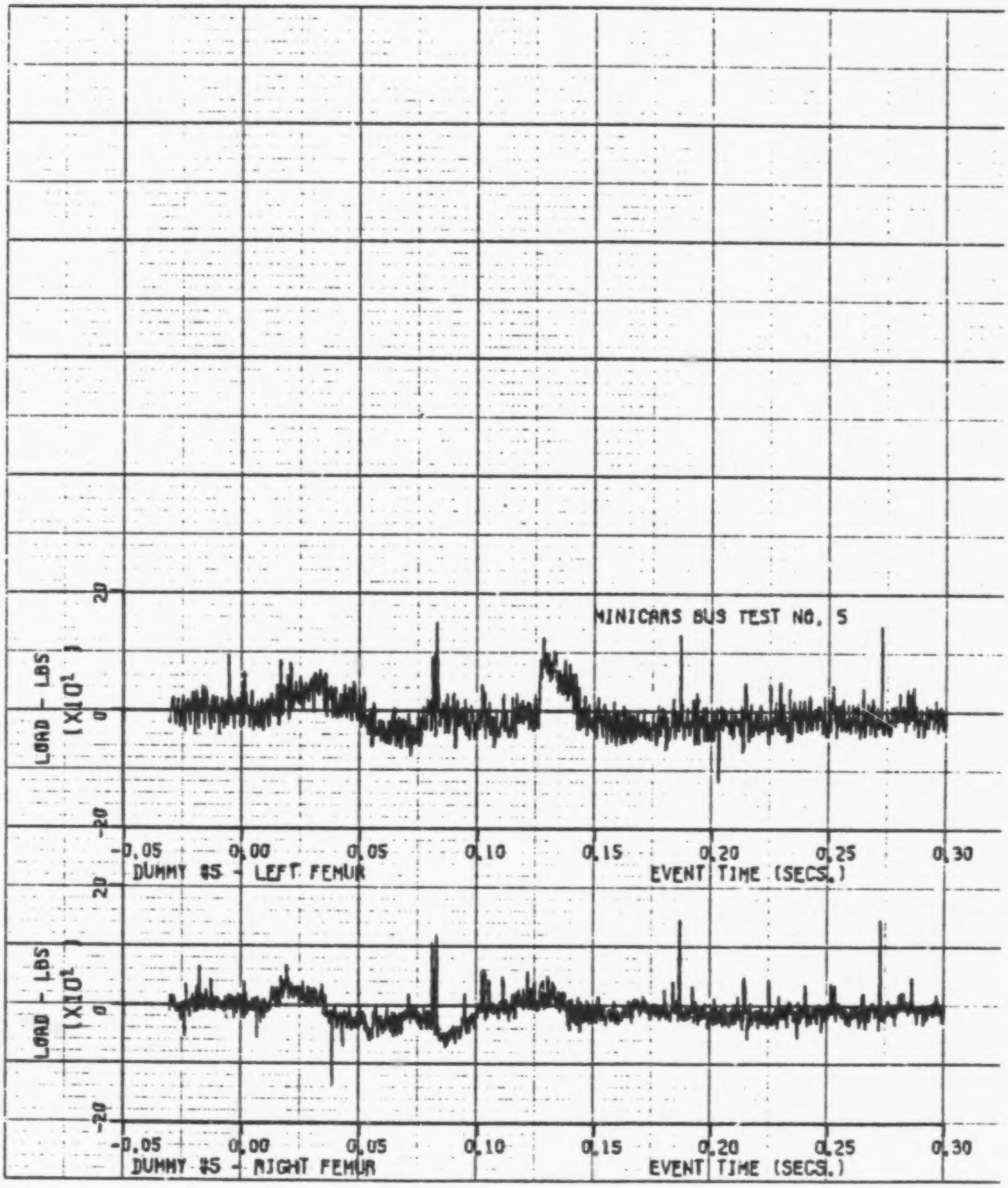
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Z COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Z COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-4
-8
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Z COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-8
-4
-2
0
2
DUMMY #5 - CHEST - Z COMP.
DISP. - IN.

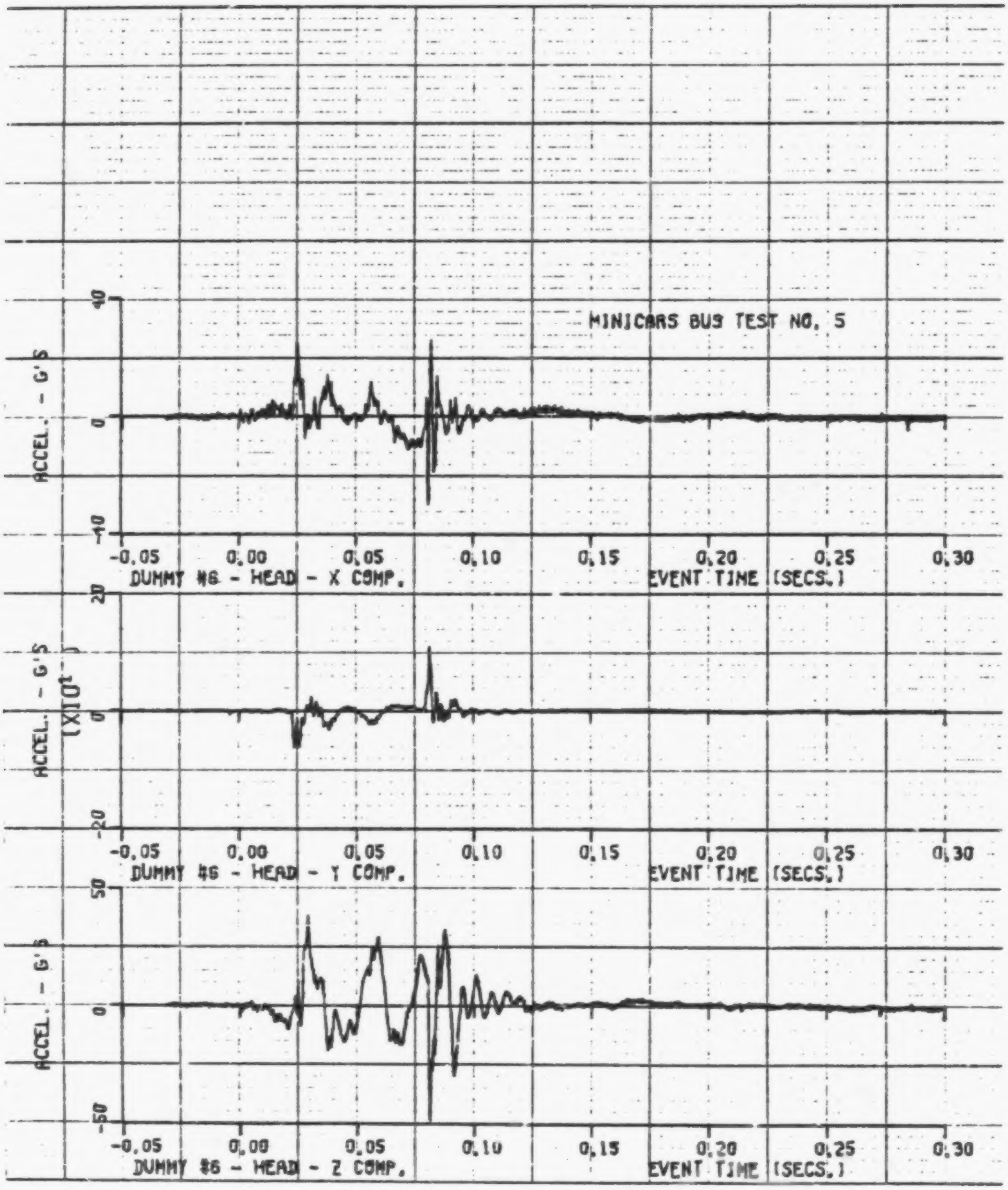
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
10
5
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST
EVENT TIME (SECS.)

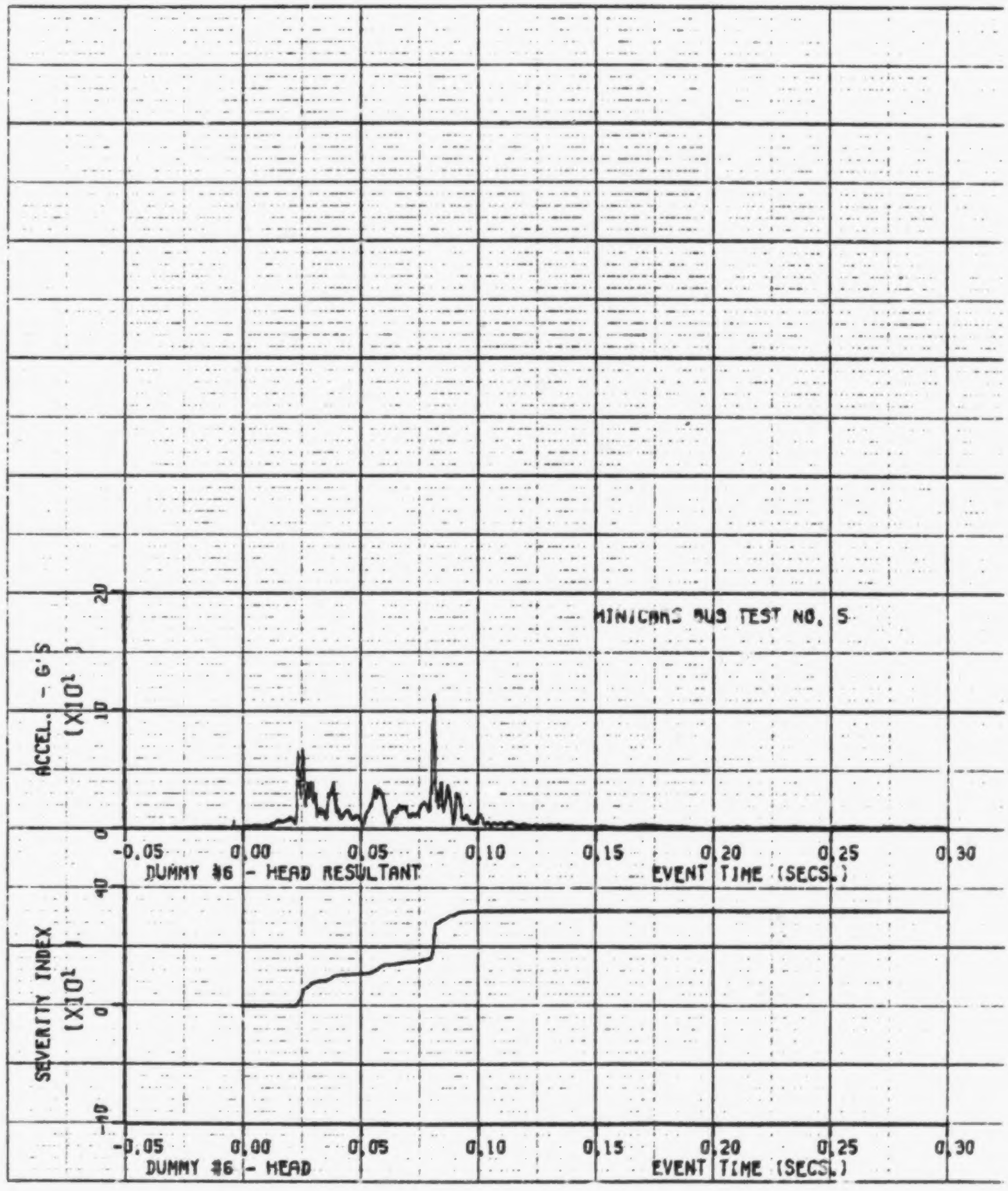
644C-V-3


MINICARS BUS TEST NO. 5
LOAD - LBS
(X10^1)
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - LEFT FEMUR
EVENT TIME (SECS.)
LOAD - LBS
(X10^1)
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - RIGHT FEMUR
EVENT TIME (SECS.)

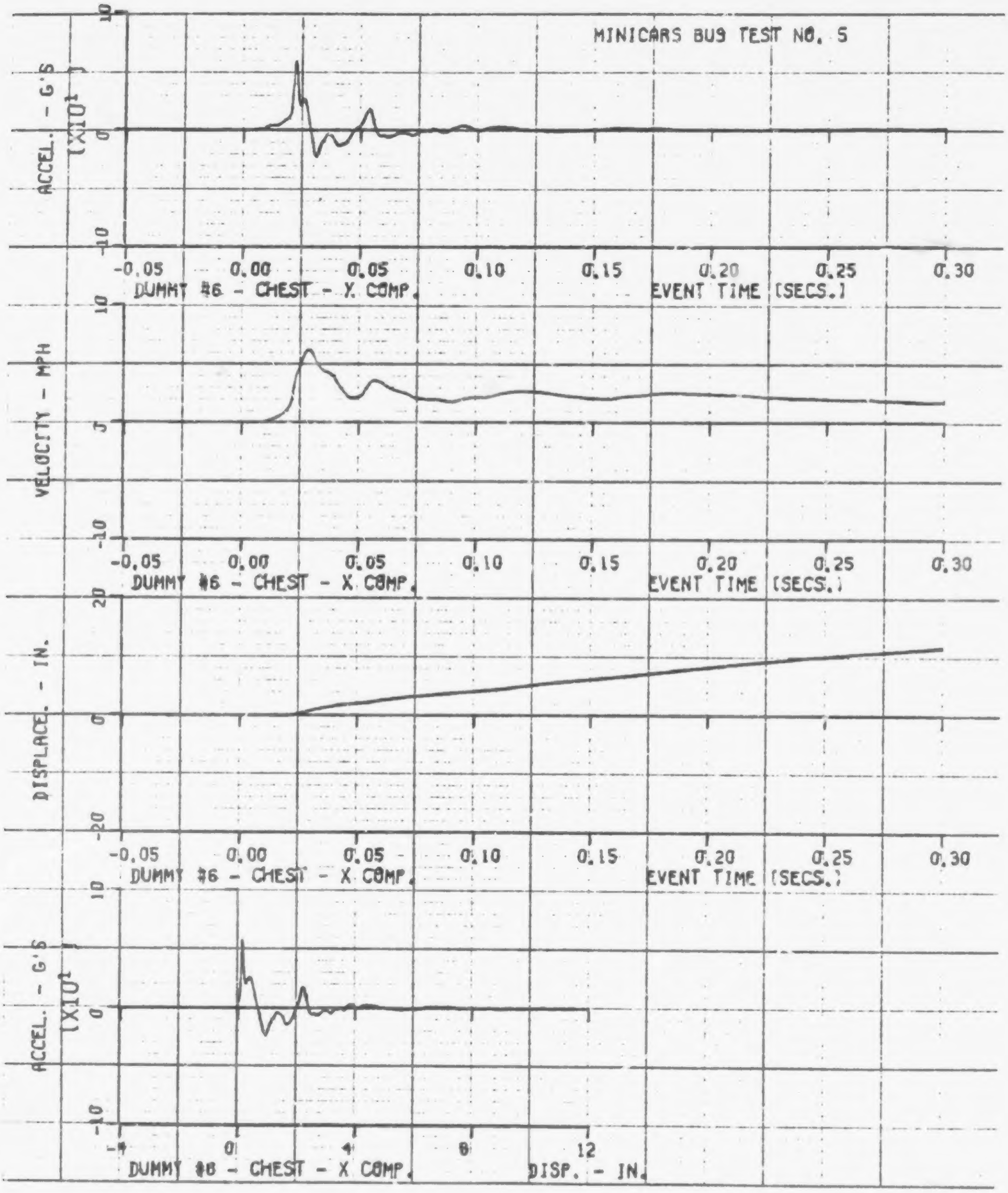
6440-V-3

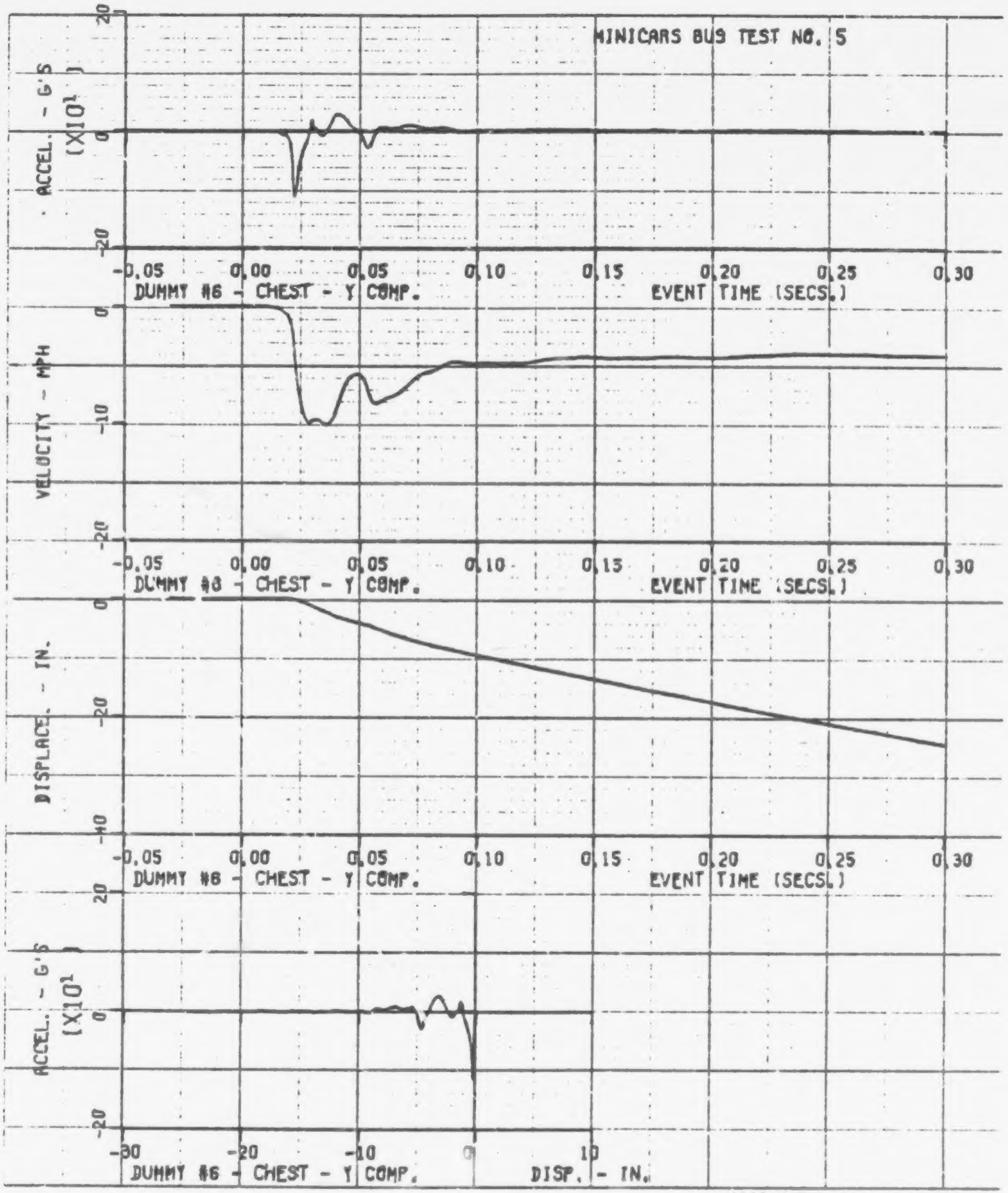

MINICARS BUS TEST NO. 5
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
(X10¹)
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
50
0
-50
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD - Z COMP.
EVENT TIME (SECS.)

6440-V-3

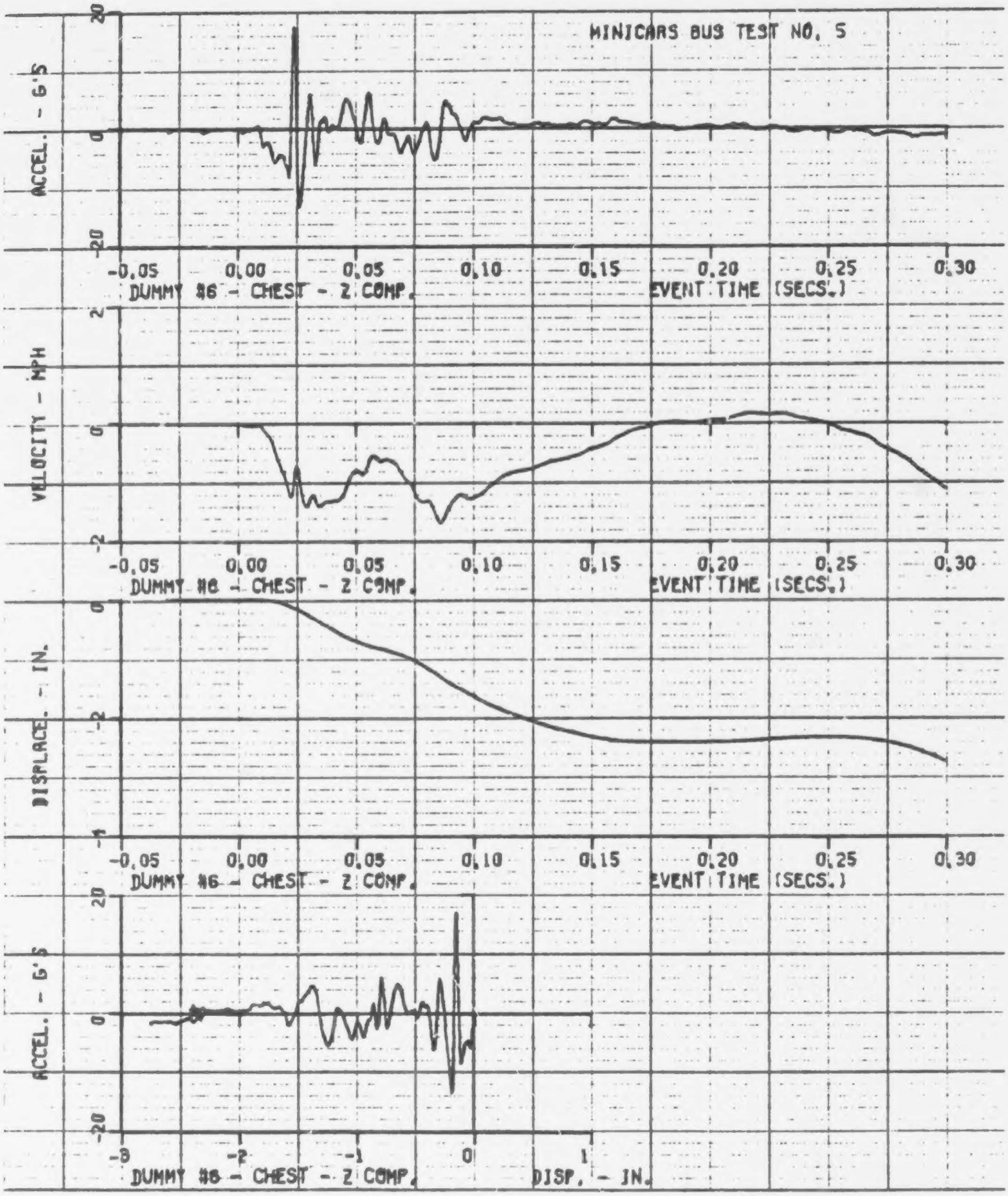

MINICARS BUS TEST NO. 5
ACCEL. - G'S
(X10^1)
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
(X10^1)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD
EVENT TIME (SECS.)

6440-V-3

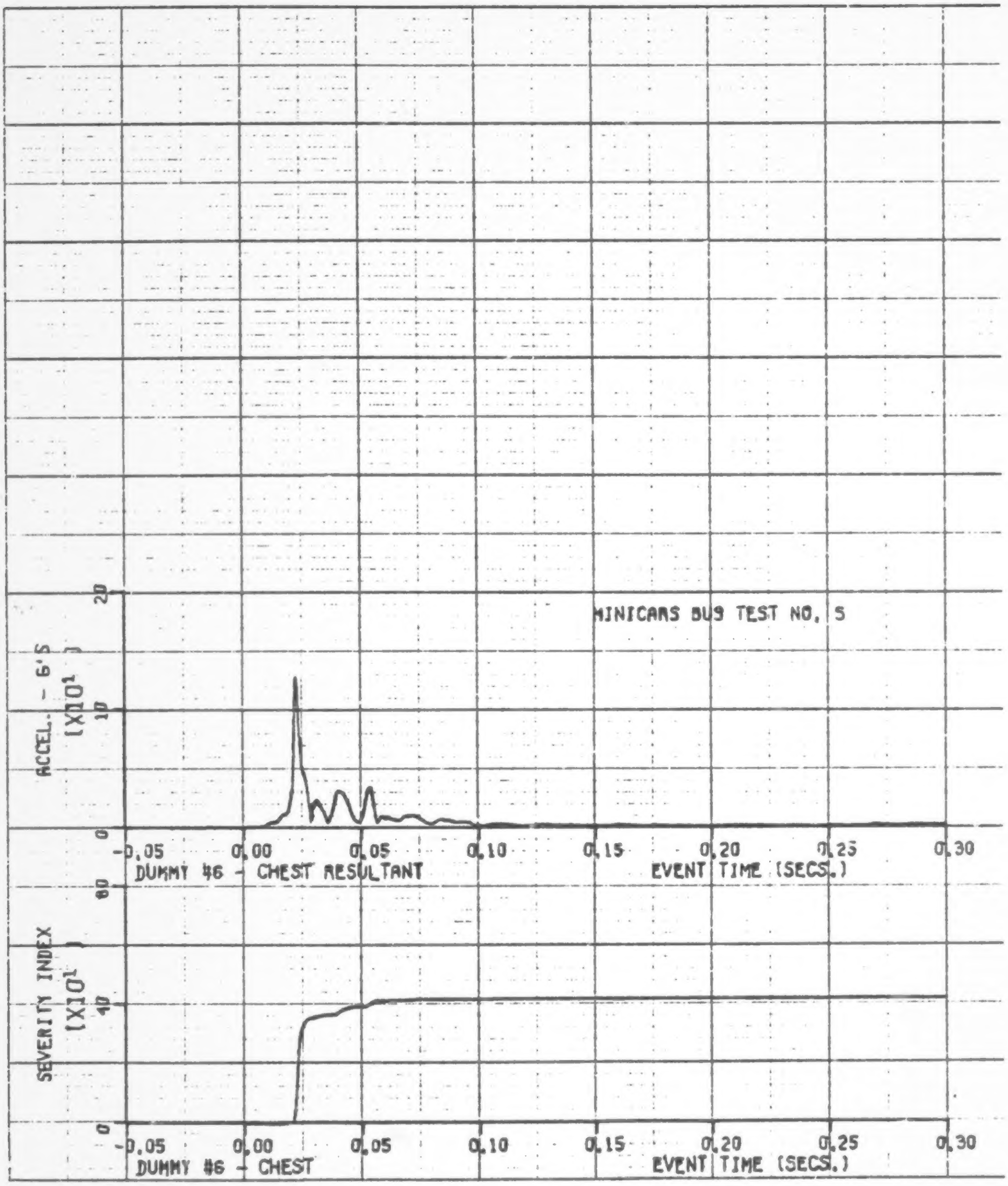

MINICARS BUS TEST NO. 5
ACCEL. - G'S (X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Y COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - X COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S (X10¹)
10
0
-10
-4
0
4
8
12
DUMMY #6 - CHEST - X COMP.
DISP. - IN.


MINICARS BUS TEST NO. 5
ACCEL. - G'S (X10¹)
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Y COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
0
-10
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Y COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-20
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S (X10¹)
20
0
-20
-30
-20
-10
0
10
DUMMY #6 - CHEST - Y COMP.
DISP. - IN.

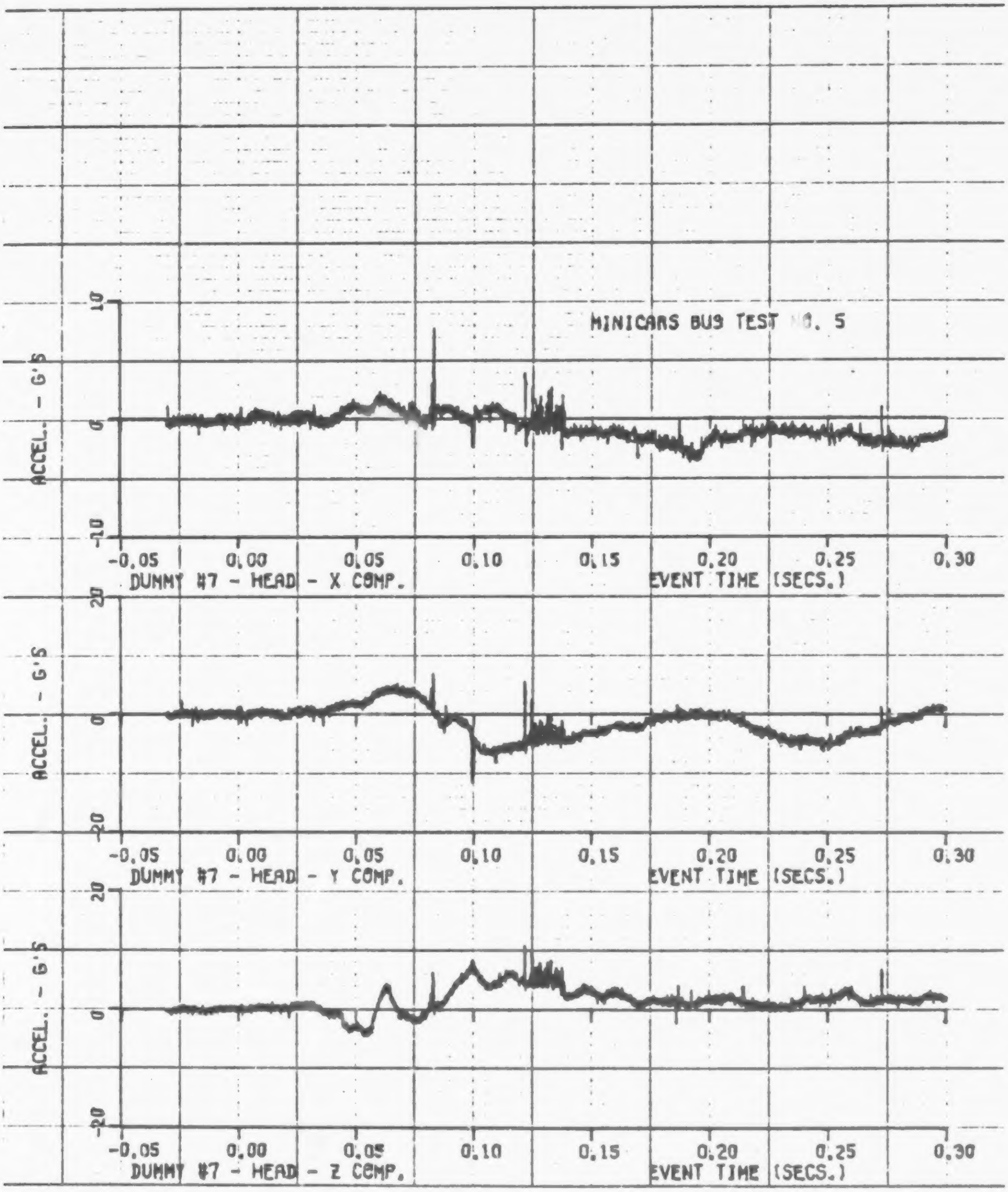
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Z COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Z COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-2
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Z COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-3
-2
-1
0
1
DUMMY #6 - CHEST - Z COMP.
DISP. - IN.

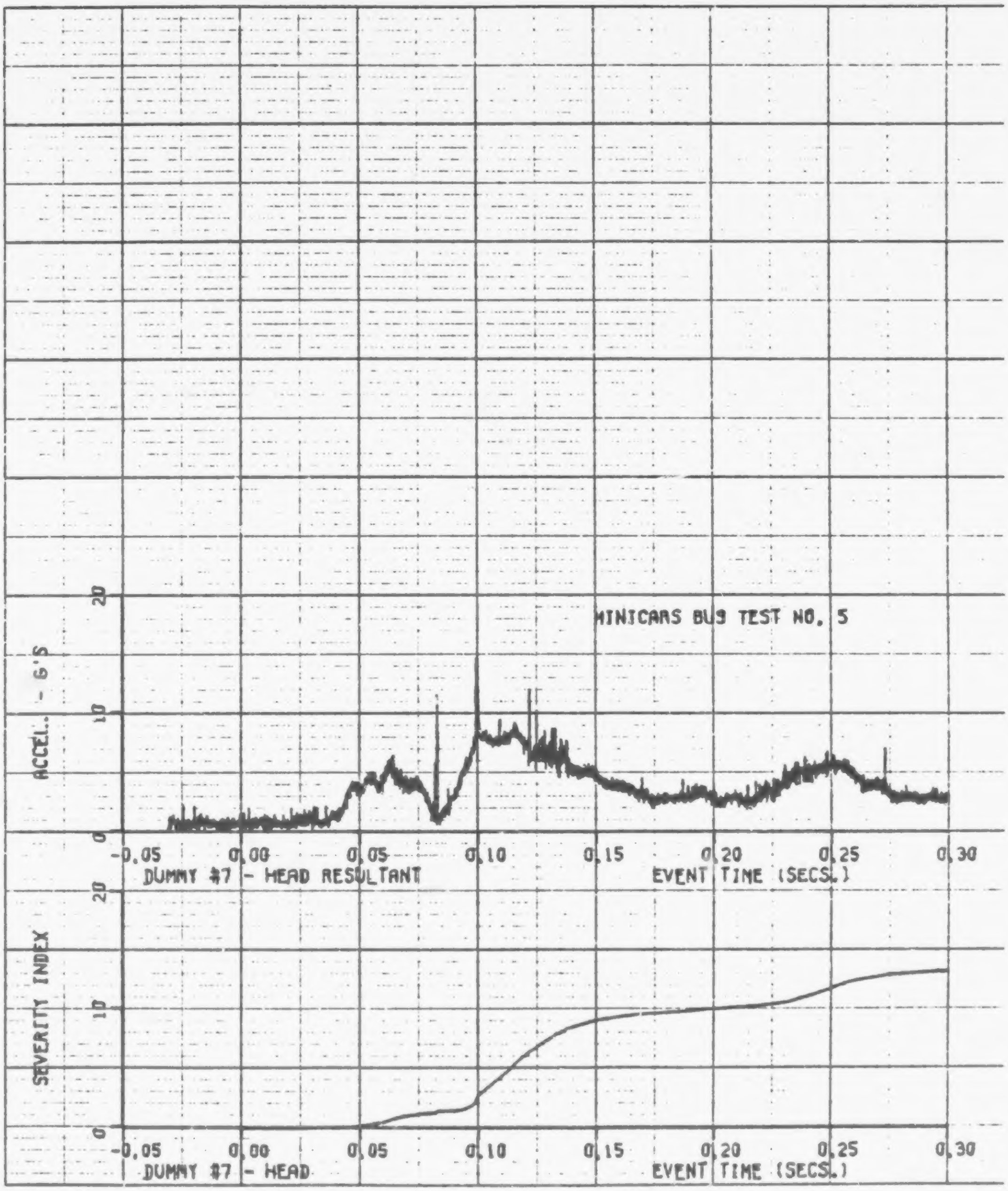
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S (X10^1)
0
10
20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX (X10^1)
0
40
80
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST
EVENT TIME (SECS.)

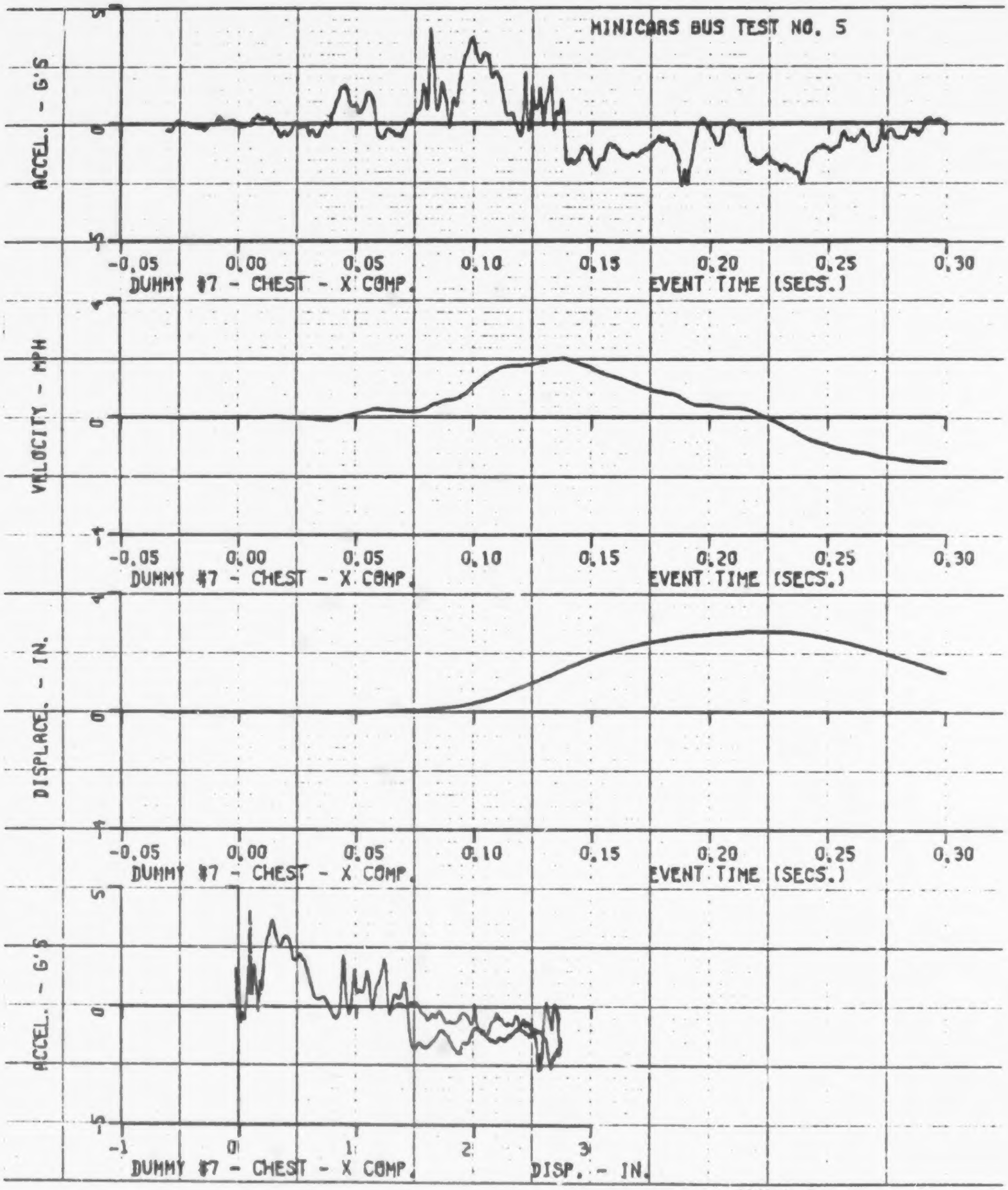
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - HEAD - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - HEAD - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - HEAD - Z COMP.
EVENT TIME (SECS.)

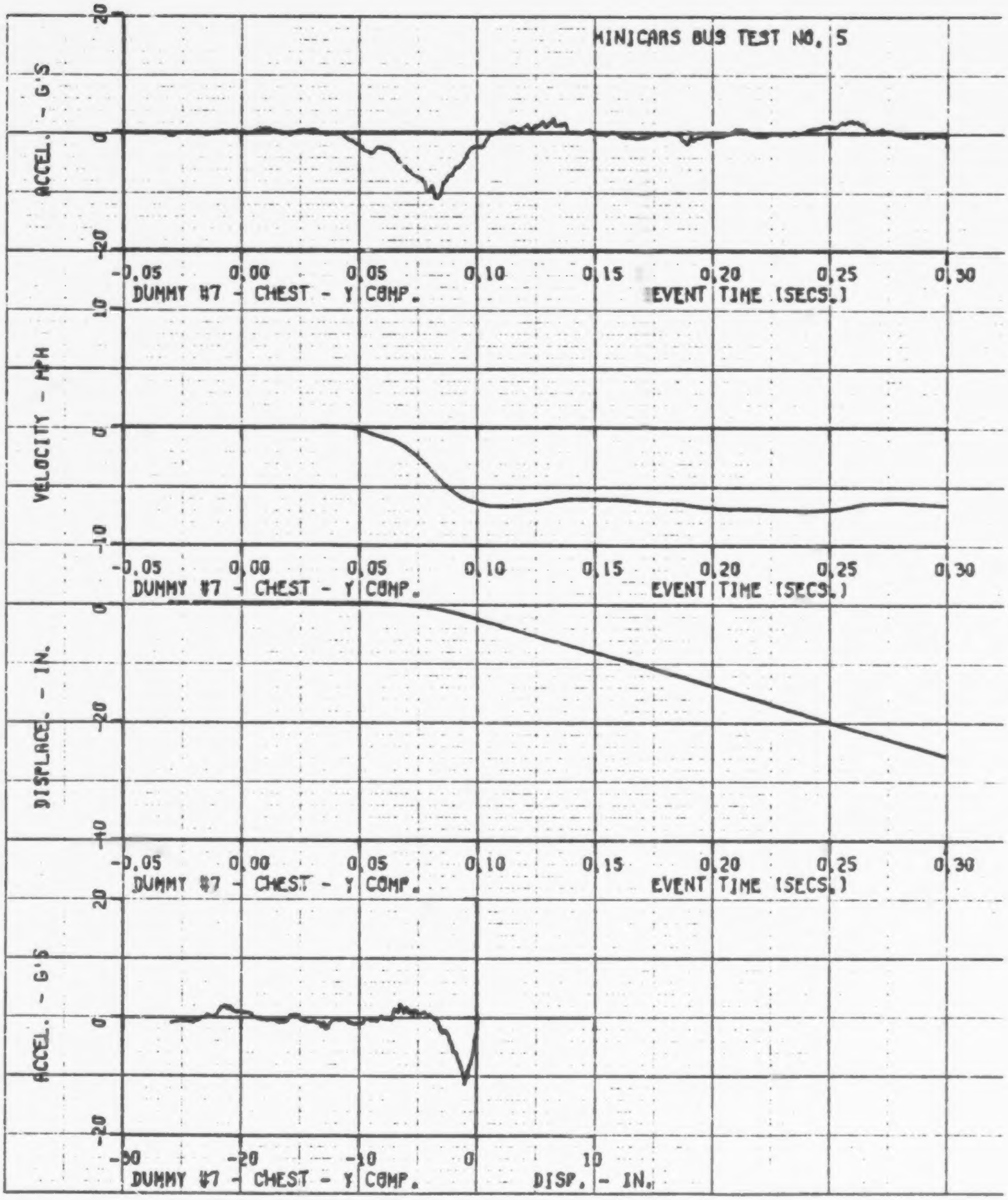
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
0
10
20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
0
10
20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - HEAD
EVENT TIME (SECS.)

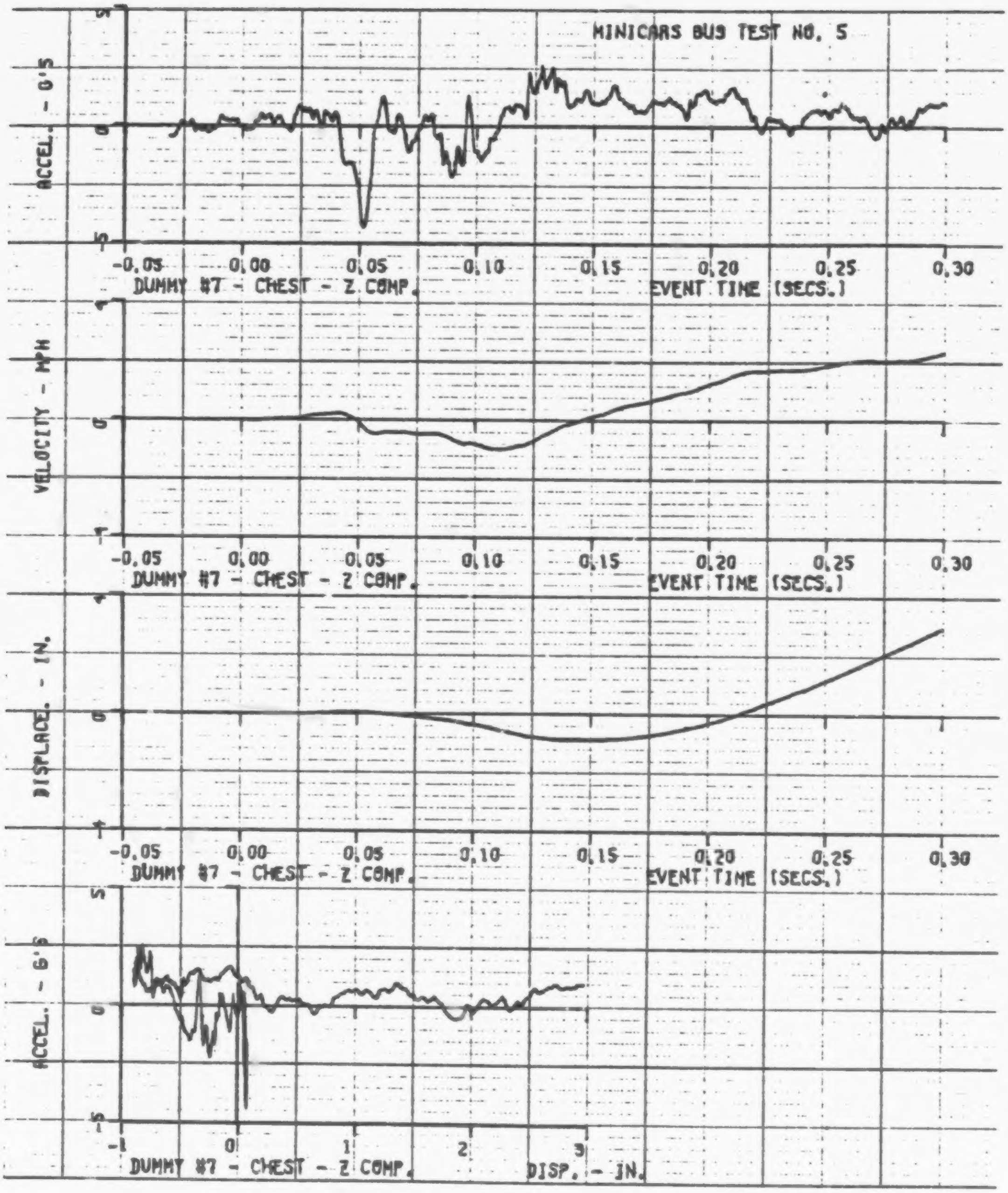
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST - X COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST - X COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
5
0
-5
-1
0
1
2
3
DUMMY #7 - CHEST - X COMP.
DISP. - IN.

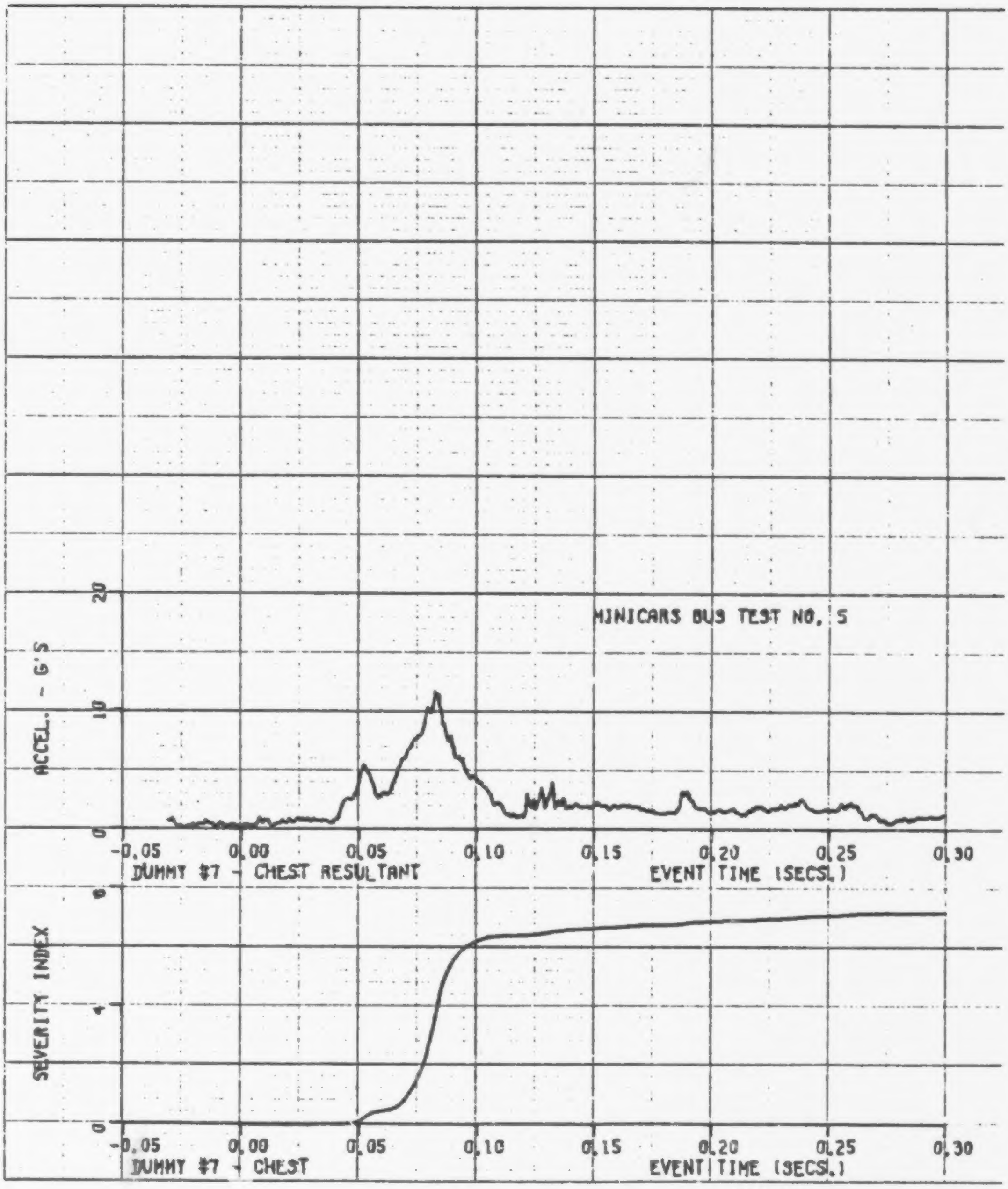
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST - Y COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
10
0
-10
DISPLACE. - IN.
0
-20
-40
ACCEL. - G'S
20
0
-20
-30
-20
-10
0
10
DISP. - IN.

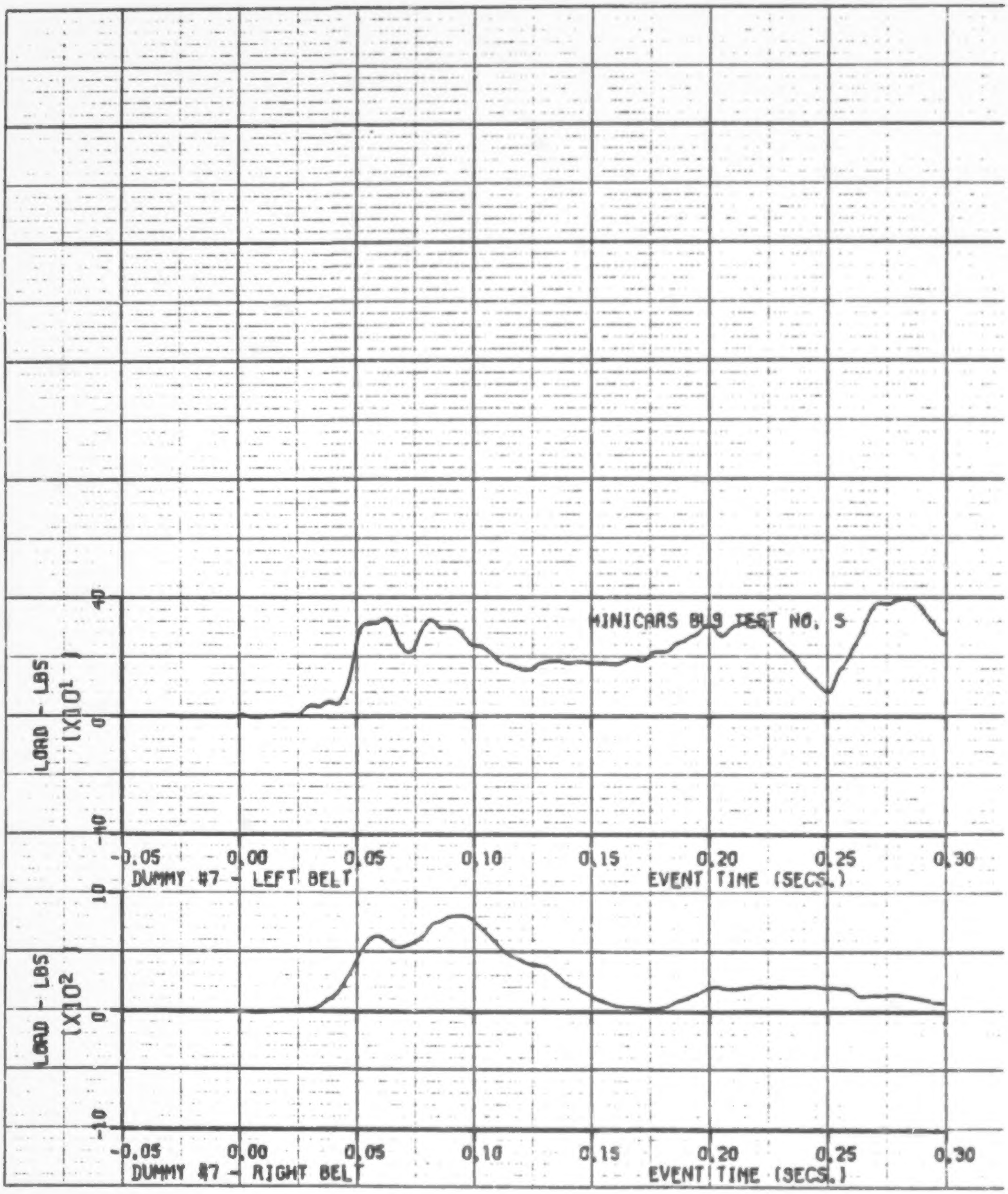
6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST - Z COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST - Z COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST - Z COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
5
0
-5
-1
0
1
2
3
DUMMY #7 - CHEST - Z COMP.
DISP. - IN.

6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
8
4
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST
EVENT TIME (SECS.)

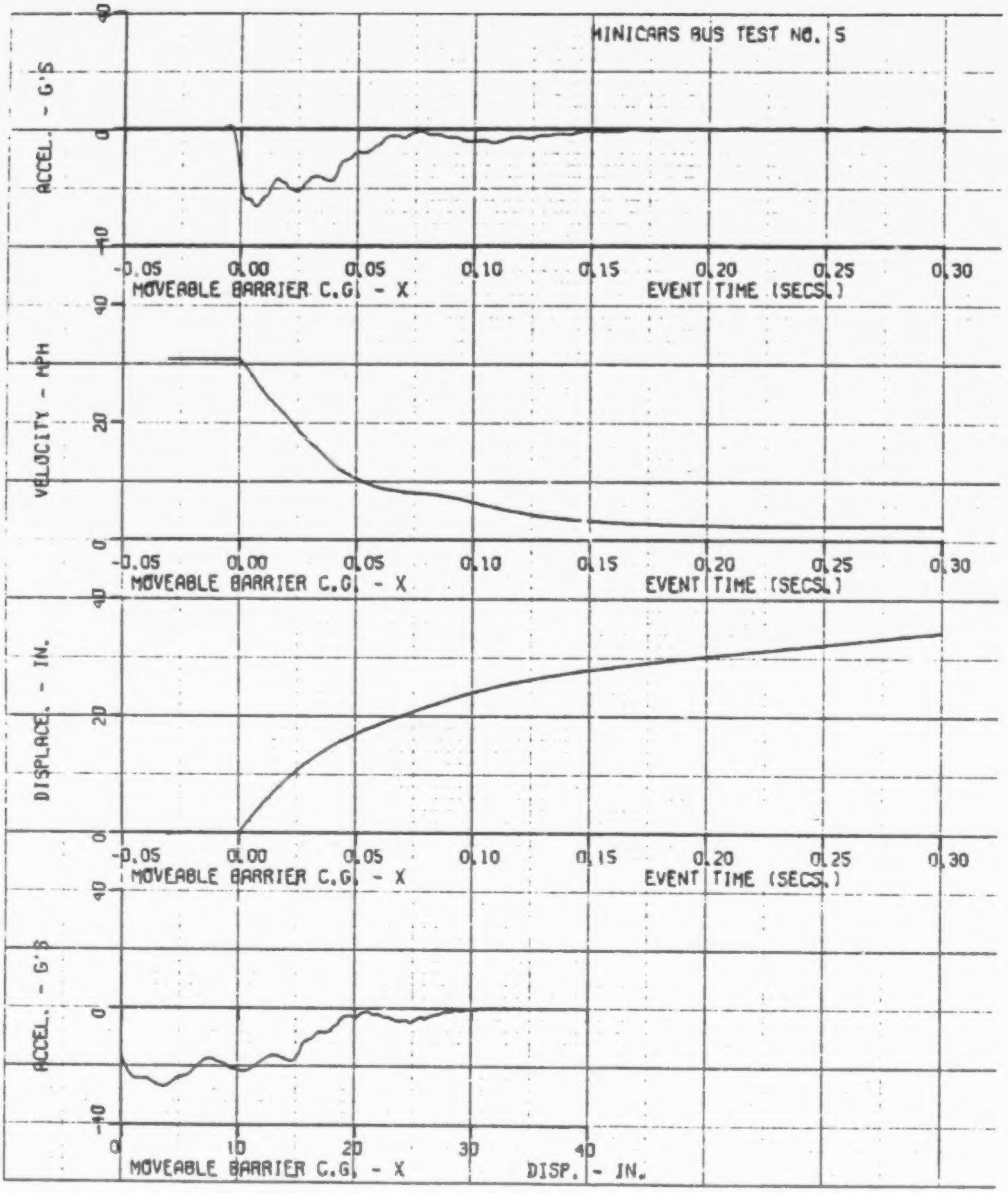
6440-V-3


MINICARS BUG TEST NO. 5
LOAD - LBS (X10^1)
40
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - LEFT BELT
EVENT TIME (SECS.)
LOAD - LBS (X10^2)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - RIGHT BELT
EVENT TIME (SECS.)

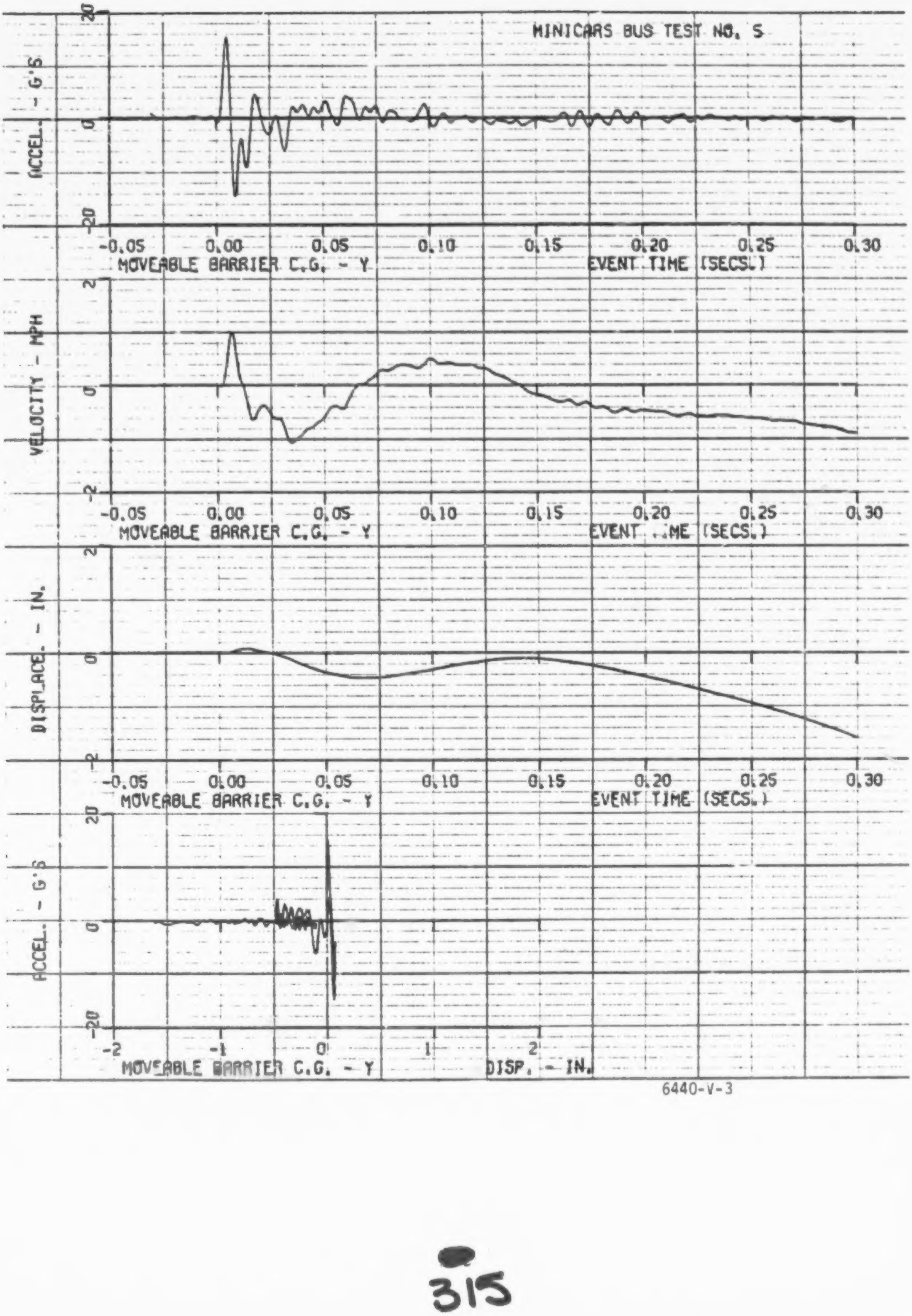
6440-V-3

MOVING BARRIER DATA

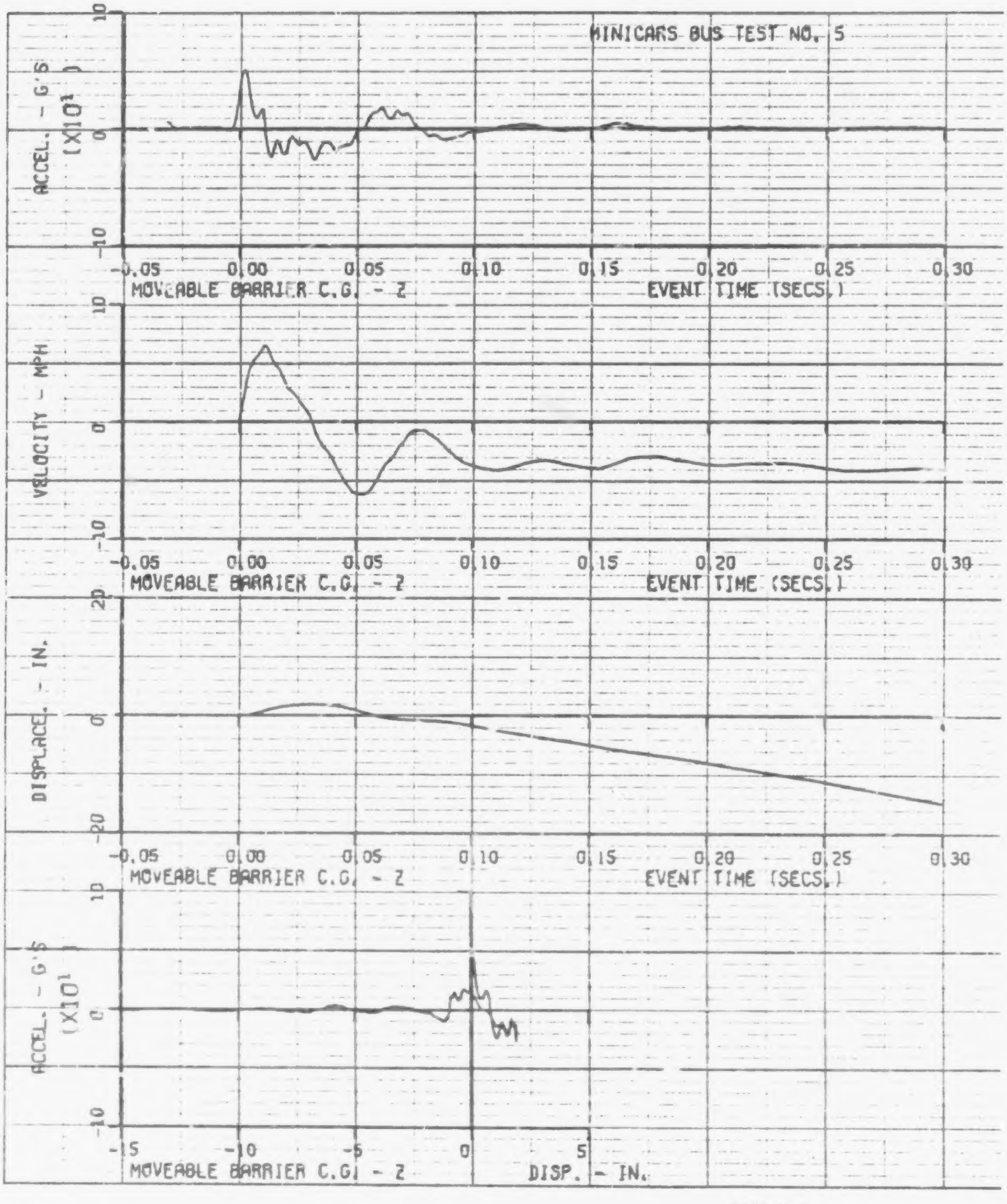
[redacted]


MINICARS BUS TEST NO. 5
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
MOVEABLE BARRIER C.G. - X
EVENT TIME (SECS.)
VELOCITY - MPH
40
20
0
DISPLACE. - IN.
40
20
0
ACCEL. - G'S
40
0
-40
0
10
20
30
40
DISP. - IN.

6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
MOVEABLE BARRIER C.G. - Y
EVENT TIME (SECS.)
VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
MOVEABLE BARRIER C.G. - Y
EVENT TIME (SECS.)
DISPLACE. - IN.
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
MOVEABLE BARRIER C.G. - Y
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-2
-1
0
1
2
MOVEABLE BARRIER C.G. - Y
DISP. - IN.

6440-V-3


MINICARS BUS TEST NO. 5
ACCEL. - G'S (X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
MOVEABLE BARRIER C.G. - Z
EVENT TIME (SECS.)
VELOCITY - MPH
DISPLACE. - IN.
20
-20
-15
-10
-5
5
DISP. - IN.

6440-V-3

APPENDIX G

CALSPAN TEST REPORTS 6440-V-4, 6440-V-2 AND 6440-V-6

This appendix contains the following test reports (prepared by the Calspan Corporation):

- Report 6440-V-4 - Crown Coach bus, front fixed barrier impact tests at 15.7 and 21.0 mph and side impact test with a 5000 pound passenger car at 50 mph
- Report 6440-V-5 - Flxible 40 foot transit bus, front fixed barrier impact test at 21.0 mph
- Report 6440-V-6 - Carpenter conventional school bus, front fixed barrier impact test at 21.0 mph.

Table F-1 is a cross reference for the test buses and test reports contained in this appendix and in Appendix E (Volume IV) and Appendix F (this volume).

TABLE G-1. CROSS REFERENCE FOR TEST BUSES AND TEST REPORTS

No.	Bus Type	Bus Description	Test Subcontractor	Test Report No.	Appendix Designation
1	Small school bus	Wayne Busette, front engine	Dynamic Science, Inc.	4936-78-105	E
2	Small school bus	Thomas Mighty Mite, front engine	Dynamic Science, Inc.	4936-78-150	E
3	Large transit bus	Flxible (35 foot overall length), rear engine	Calspan Corporation	6440-V-1	F
4	Large school bus	Carpenter conventional 66 passenger bus, front engine	Calspan Corporation	6440-V-2	F
5	Large transit bus	GM "New Look" Transit Coach (40 foot overall length), rear engine	Calspan Corporation	6440-V-3	F
6	Large school bus	Crown Coach unitized construction school bus, underfloor engine	Calspan Corporation	6440-V-4	G
7	Large transit bus	Flxible (40 foot overall length) rear engine	Calspan Corporation	6440-V-5	G
8	Large school bus	Carpenter conventional 66 passenger bus, front engine	Calspan Corporation	6440-V-6	G

CALSPAN ADVANCED TECHNOLOGY CENTER

BUS CRASH TEST PROGRAM
TEST NO. 6A, TEST NO. 6B & 7

Calspan Report No. 6440-V-4

Prepared for:

MINICARS, INC.
55 DEPOT ROAD
GOLETA, CALIFORNIA 93017

PURCHASE ORDER NO. 5458
IN SUPPORT OF: NHTSA CONTRACT NO. DOT-HS-7-01774

TEST:	Test No. 6A, Test No. 6B & 7 (Crown Coach Bus)
TYPE OF TEST:	Test No. 6A & 6B, Frontal Fixed Barrier Test No. 7, 1971 Ford LTD Into Side of Bus
TEST DATE:	3-20-79, 3-21-79 & 3-22-79

A DIVISION OF CALSPAN CORPORATION
AN ARVIN COMPANY PO BOX 400 BUFFALO NEW YORK 14225

319

TABLE OF CONTENTS

Page No.

LIST OF FIGURES iii

LIST OF TABLES v

PRESENTATION OF RESULTS 1

TEST OBJECTIVE 2

GENERAL COMMENTS - TEST NO. 6A 4

TEST NO. 6A DATA 21

GENERAL COMMENTS - TEST NO. 6B 80

TEST NO. 6B DATA 93

GENERAL COMMENTS - TEST NO. 7 164

TEST NO. 7 DATA 177

LIST OF FIGURES

Figure No.		Page No.
1	TEST NO. 6A VEHICLE DIMENSIONS AND PHOTOGRAPHIC TARGETS	8
2	PRE-TEST NO. 6A SCHOOL BUS (CROWN COACH) EXTERIOR, FRONTAL BARRIER TEST	9
3	POST-TEST NO. 6A SCHOOL BUS (CROWN COACH) EXTERIOR, FRONTAL BARRIER TEST	10
4	PRE-TEST NO. 6A SCHOOL BUS (CROWN COACH) INTERIOR, FRONTAL BARRIER TEST	11
5	POST-TEST NO. 6A SCHOOL BUS (CROWN COACH) INTERIOR, FRONTAL BARRIER TEST	12
6	PRE-TEST NO. 6A WHEELCHAIR TIE-DOWNS ON SCHOOL BUS TEST	13
7	TEST NO. 6A ACCELEROMETER LOCATIONS, FRONTAL BARRIER	15
8	TEST NO. 6A DUMMY SEATING POSITION AND INSTRUMENTATION FRONTAL BARRIER	16
9	PRE- AND POST-TEST NO. 6A, DUMMY LOCATIONS	17
10	TEST NO. 6A, ON-BOARD CAMERA COVERAGE	18
11	TEST NO. 6A, OFF-BOARD CAMERA COVERAGE	19
12	TEST NO. 6B VEHICLE DIMENSIONS AND PHOTOGRAPHIC TARGETS	84
13	POST-TEST NO. 6B SCHOOL BUS (CROWN COACH) EXTERIOR, FRONTAL BARRIER TEST	85
14	PRE-TEST NO. 6B SCHOOL BUS (CROWN COACH) INTERIOR FRONTAL BARRIER TEST	86
15	POST-TEST NO. 6B SCHOOL BUS (CROWN COACH) INTERIOR, FRONTAL BARRIER TEST	87

LIST OF FIGURES - (Continued)

Figure No.		Page No.
16	TEST NO. 6B ACCELEROMETER LOCATIONS, FRONTAL BARRIER	88
17	TEST NO. 6B DUMMY SEATING POSITION AND INSTRUMENTATION FRONTAL BARRIER	89
18	PRE- AND POST-TEST NO. 6B DUMMY LOCATIONS	90
19	TEST NO. 6B ON-BOARD CAMERA COVERAGE	91
20	TEST NO. 6B OFF-BOARD CAMERA COVERAGE	92
21	TEST NO. 7 VEHICLE DIMENSIONS AND PHOTOGRAPHIC TARGETS	167
22	PRE-TEST NO. 7 EXTERIOR VIEWS	168
23	POST-TEST NO. 7 EXTERIOR VIEWS	169
24	PRE-TEST NO. 7 INTERIOR VIEWS	170
25	POST-TEST NO. 7 INTERIOR VIEWS	171
26	TEST NO. 7 DUMMY SEATING POSITION AND INSTRUMENTATION	172
27	PRE- AND POST-TEST NO. 7 DUMMY LOCATIONS	173
28	TEST NO. 7 ON-BOARD CAMERA COVERAGE	174
29	TEST NO. 7 OFF-BOARD CAMERA COVERAGE	175
30	TEST NO. 7 BUS DISPLACEMENT	176

LIST OF TABLES

Table No.		Page No.
1	TEST NO. 6A CRASH TEST SUMMARY	3
2	TEST NO. 6A DUMMY INJURY CRITERIA VALUES	5
3	TEST NO. 6A BUS TEST WEIGHTS	6
4	TEST NO. 6A POST-CRASH DATA SHEET	7
5	TEST NO. 6B CRASH TEST SUMMARY	79
6	TEST NO. 6B DUMMY INJURY CRITERIA VALUES	81
7	TEST NO. 6B BUS AND BARRIER TEST WEIGHTS	82
8	TEST NO. 6B POST-CRASH DATA SHEET	83
9	TEST NO. 7 CRASH TEST SUMMARY	163
10	TEST NO. 7 DUMMY CRITERIA VALUES	165
11	TEST NO. 7 BUS & AUTOMOBILE TEST WEIGHTS	166

BLANK PAGE

PRESENTATION OF RESULTS

This test report presents all the test results obtained from Test No. 6A (Frontal Barrier Impact), Test No. 6B[*] and Test No. 7 (Side Impact). These tests were performed on March 20, 21 and 22, 1979 at Calspan's Crash Test Facility in Buffalo, New York. The test vehicle was a crown coach bus.

Included in this document are still photographs of pre- and post-test conditions of the test vehicle and dummies. Dummy identification and pre- and post-test positions of all dummies are presented. Instrumentation identification and locations of all transducers for all electronic data are presented along with dummy and vehicle data in a plotted format. High speed camera locations and camera speeds are listed in table form.

---

[*] 6B was repeat of Test No. 6A since 6A was approximately 25% under test plan speed.

TEST OBJECTIVE

The principal objective in performing the full-scale crash tests on the Minicars Crown Bus was to obtain a deceleration crash pulse for the vehicle and to provide a crash environment to test the following parameters:

- Performance of the wheelchair tie-down attachments as shown in Figure 6.
- Acquire injury criteria data on the on-board dummies.
- Obtain trajectory information on the on-board dummies.

Table 1

CRASH TEST SUMMARY

TEST NO. 6A **PROJECT** MINICARS BUS TEST

DATE 3/20/79 **TIME** 3:30 pm **TEMP.** 58°F

TEST CONDITION FRONTAL PERPENDICULAR FIXED BARRIER (20 MPH)

VEHICLE NO. 1 CROWN COACH BUS

VEHICLE NO. 2

	VEH. NO. 1
TEST WEIGHT (lbs)	27460
IMPACT ANGLE (deg)*	0
IMPACT VELOCITY (mph)**	15.08
MAX. CRUSH (in)	5.9
MAX. INTRUSION (in)	

DUMMIES	VEH. NO. 1
TYPE	5 - 50% 2 - 6-YEAR OLD CHILD DUMMIES
LOCATION	SEE FIGURE 8
RESTRAINT	SEE FIGURE 8

NUMBER OF DATA CHANNELS	72
NUMBER OF HIGH SPEED CAMERAS	12

---

* WITH RESPECT TO TOW TRACK CENTERLINE

** SPEED TRAP MEASUREMENT (±0.5% ACCURACY)

GENERAL COMMENTS - TEST NO. 6A

All cameras functioned properly.

Right side wheelchair (Dummy No. 7) floor attachment allowed chair to lift at rear, pitch down while pivoting about front wheels, the chair came to rest near its original location.

Dummy No. 6 moved sideways into rear of No. 7 wheelchair, then Dummy No. 5 forced Dummy No. 6 down and into the side of the bus.

Dummy No. 4 was pushed laterally into the bus center isle and onto the floor by the lateral movement of Dummy No. 3 during rebound.

Dummy No. 2 wheelchair attachments allowed chair to slide forward and rebound rearward. Dummy No. 2 hit the back of the seat beside the wheelchair. The chair came to rest near its original location.

Dummy No. 1 head passed several inches beyond the front of the steering wheel rim and the chest crushed down on the hub of the steering wheel.

Table 2

DUMMY INJURY CRITERIA VALUES

BUS TEST NO. 6A

	MAXIMUM ACCELERATION (G)*								SEVERITY INDEX	
	X	·Y	Z	R	X	Y	Z	R	HEAD	CHEST
DUMMY (1)	8	-30	19	35	-11.5	9	8.5	13.5	255	32
*DUMMY (2)	-	-	-	-	-	-	-	-	-	-
DUMMY (3)	-17	7	30	34	-24.5	-2.7	7	25.5	120.5	44
DUMMY (4)	-45	-40	38	51	-24	-5.3	-7	25.5	240	56
DUMMY (5)	-4	-7	4	7.5	-.6	-4	4	5.8	24	4
DUMMY (6)	-20	-115	16	115	-5.8	9	5.5	11	1200	25
*DUMMY (7)	-	-	-	-	-	-	-	-	-	-

	MAXIMUM FORCE - SEAT BELT LOADS (LBS)	
	RIGHT BELT LOAD	LEFT BELT LOAD
DUMMY (1)	360	400
DUMMY (2)	310	270
DUMMY (7)	700	1600

	MAXIMUM FORCE - FEMUR LOADS (LBS)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY 3	350	750
DUMMY 5	50	50

		HEAD INJURY CRITERIA		
	HIC	t_1(SEC)	t_2(SEC)	AVE. ACC. (G) t_1 TO t_2
DUMMY (1)	149	.086	.179	19.2
*DUMMY (2)	-	-	-	-
DUMMY (3)	85	.140	.181	21.4
DUMMY (4)	174	.143	.154	49.1
DUMMY (5)	17	.095	.299	5.9
DUMMY (6)	992	.177	.180	145.1
*DUMMY (7)	-	-	-	-

* DATA LOST DUE TO TURN OFF OF TAPE MACHINE

Table 3

TEST NO. 6A BUS & AUTOMOBILE TEST WEIGHTS

LEFT FRONT	=	6310 LBS	LEFT REAR	=	8290 LBS
RIGHT FRONT	=	4810 LBS	RIGHT REAR	=	8050 LBS
TOTAL FRONT	=	11,120 LBS	TOTAL REAR	=	16,340 LBS

TOTAL WEIGHT = 11,120 LBS + 16,340 LBS = 27,460 LBS

WHEEL BASE = 258 INCHES

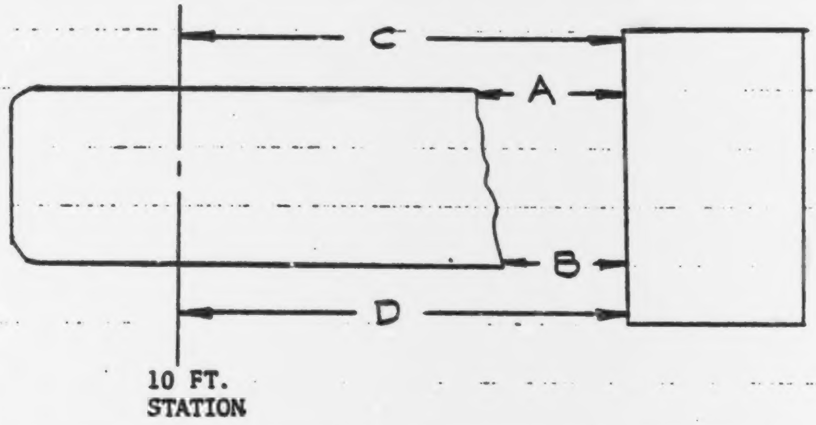
$$Cg_{FW} = \frac{16,340 \text{ X } 258}{27,460} = 153.52 \text{ INCHES}$$

330

Table 4

POST-CRASH DATA SHEET

BUS TEST NO. 6A



DIMENSIONS:

A = 89.6 INCHES

B = 86.7 INCHES

C = 202.5 INCHES

D = 202 INCHES

$E = \frac{A + B}{2} =$ 88.15 INCHES (REBOUND)

$F = \frac{C + D}{2} =$ 202.2 INCHES

G = F-E = 114.05 INCHES

CRUSH = 120-114.05 = 5.9 INCHES

331

332

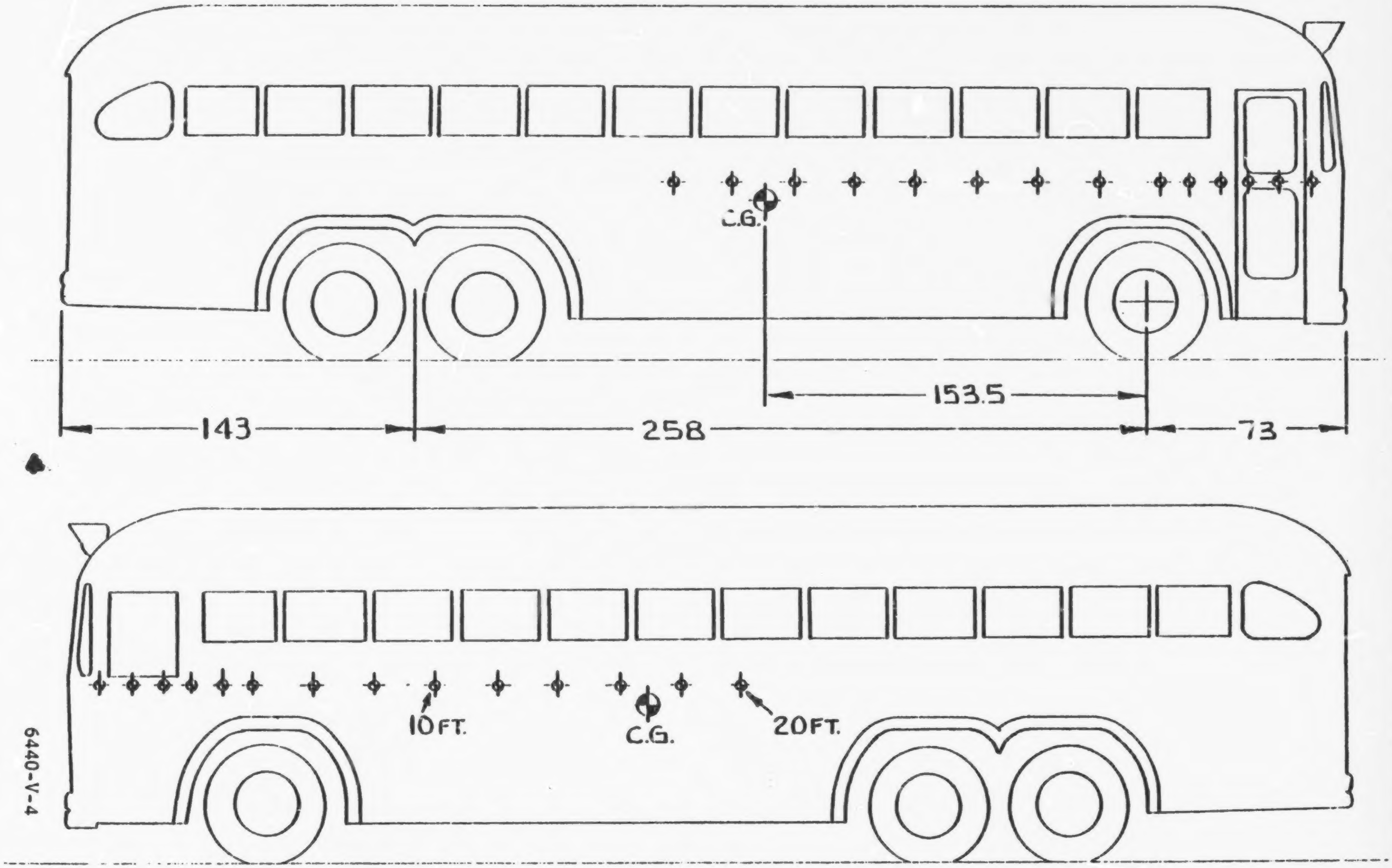

C.G.
153.5
143
258
73
10 FT.
C.G.
20 FT.
6440-V-4

FIGURE 1 VEHICLE DIMENSIONS AND PHOTOGRAPHIC TARGETS FOR TEST NO. 6A

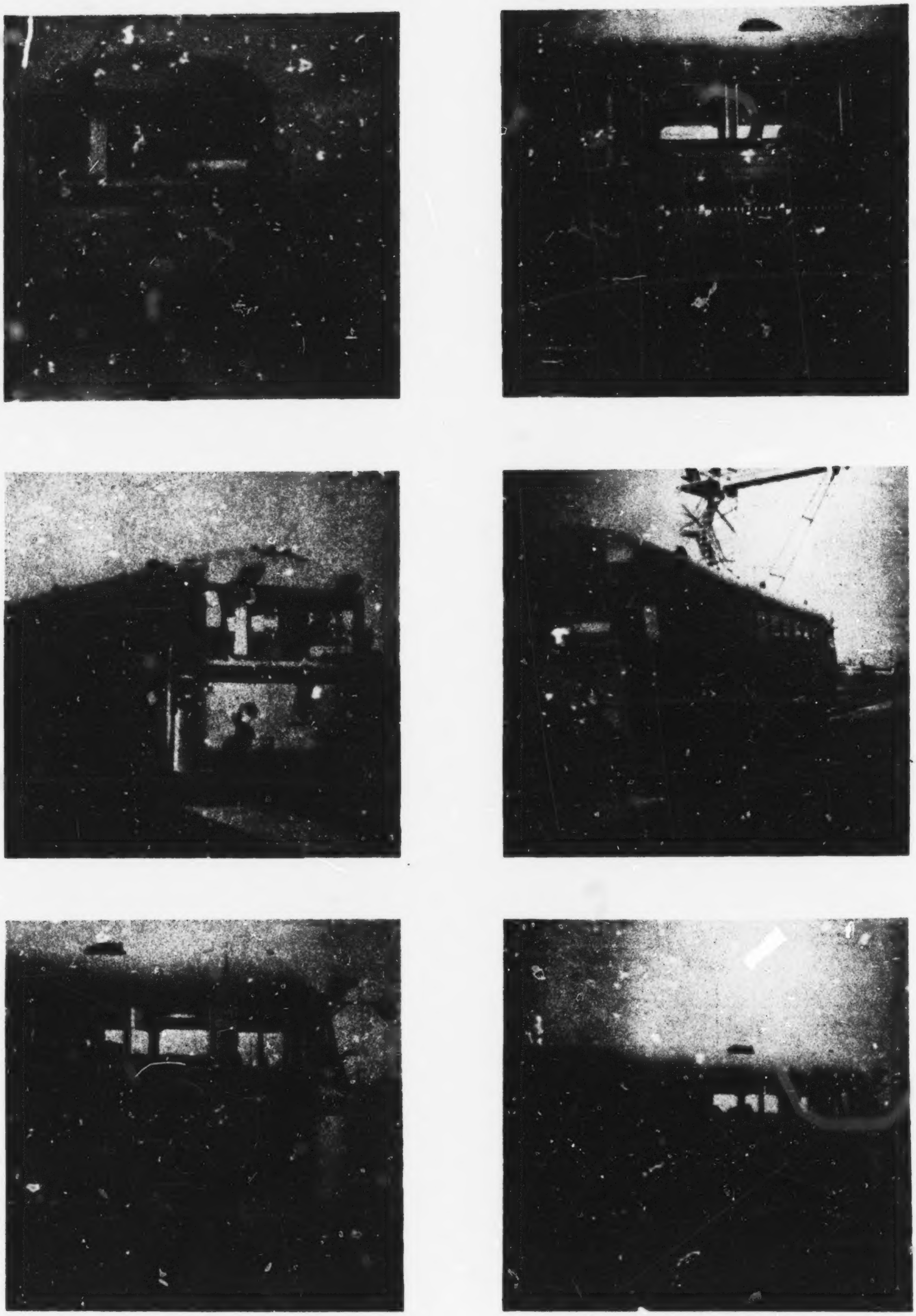


Figure 2 PRE-TEST NO. 6A, EXTERIOR VIEWS, FRONTAL BARRIER TEST

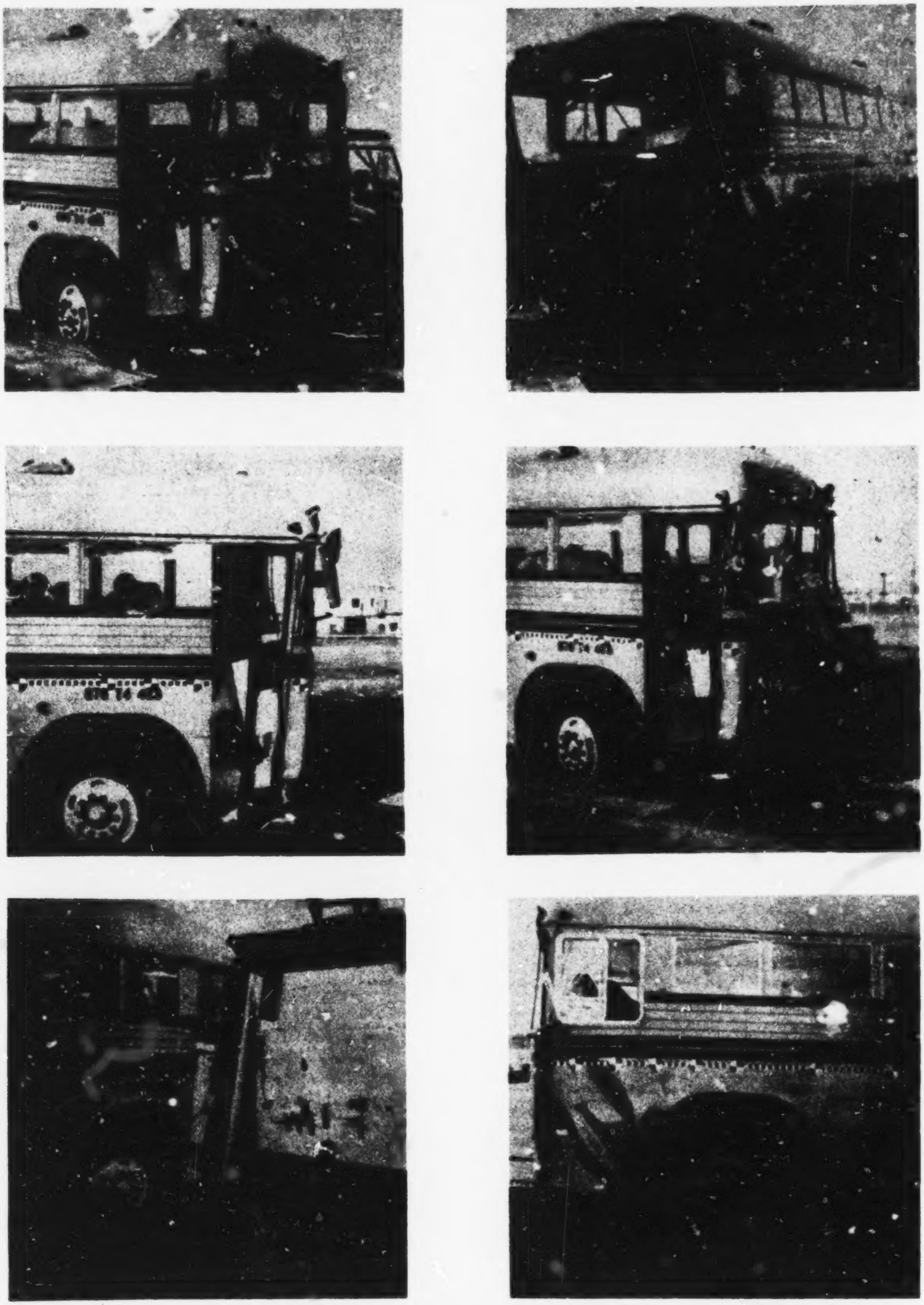


Figure 3 POST-TEST NO. 6A, EXTERIOR VIEW, FRONTAL BARRIER TEST

6440-V-4

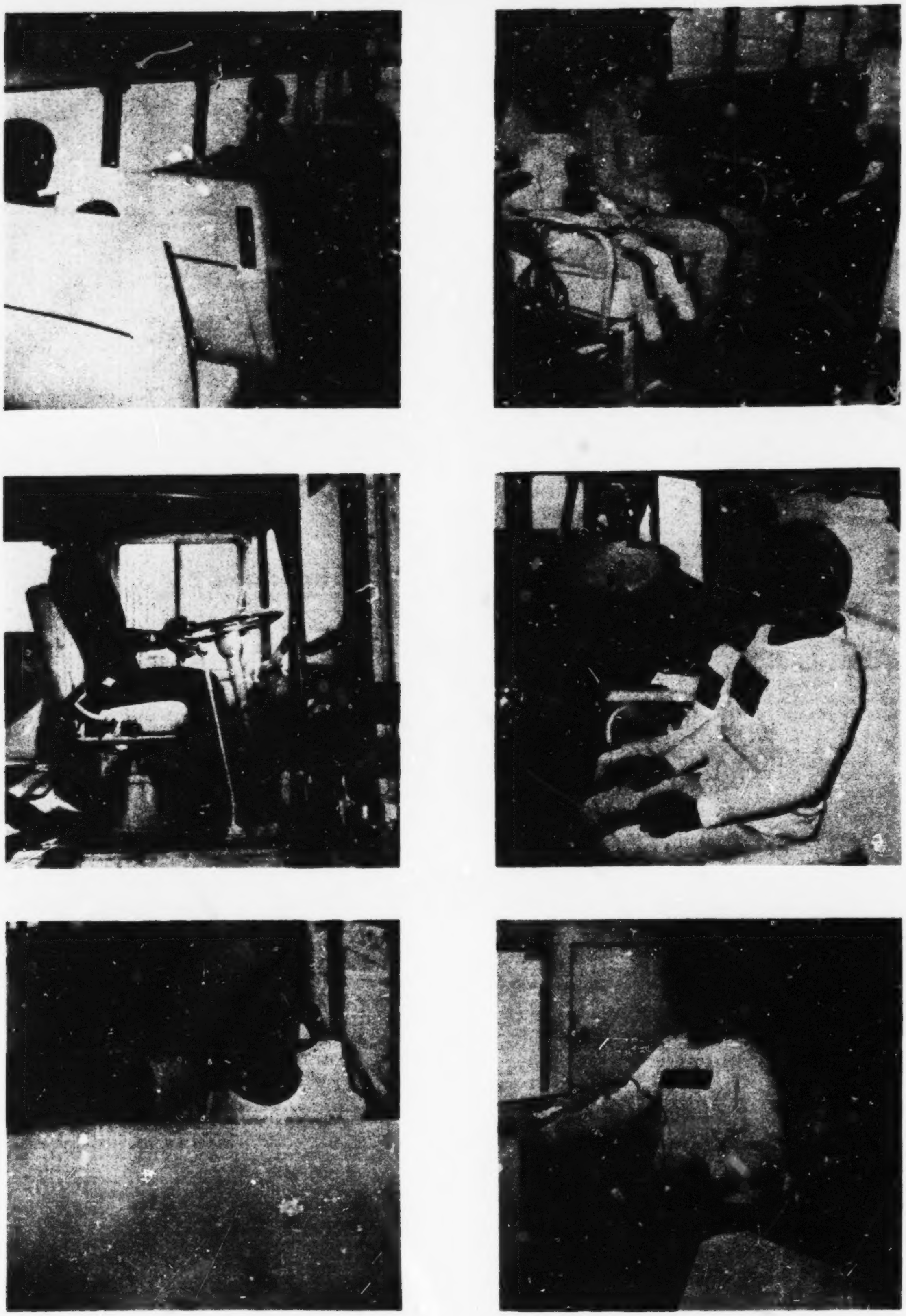


Figure 4 PRE-TEST NO. 6A, INTERIOR VIEWS, FRONTAL BARRIER TEST

6440-V-4

Figure 5 POST-TEST NO. 6A, INTERIOR VIEWS, FRONTAL BARRIER TEST

6440-V-4

336

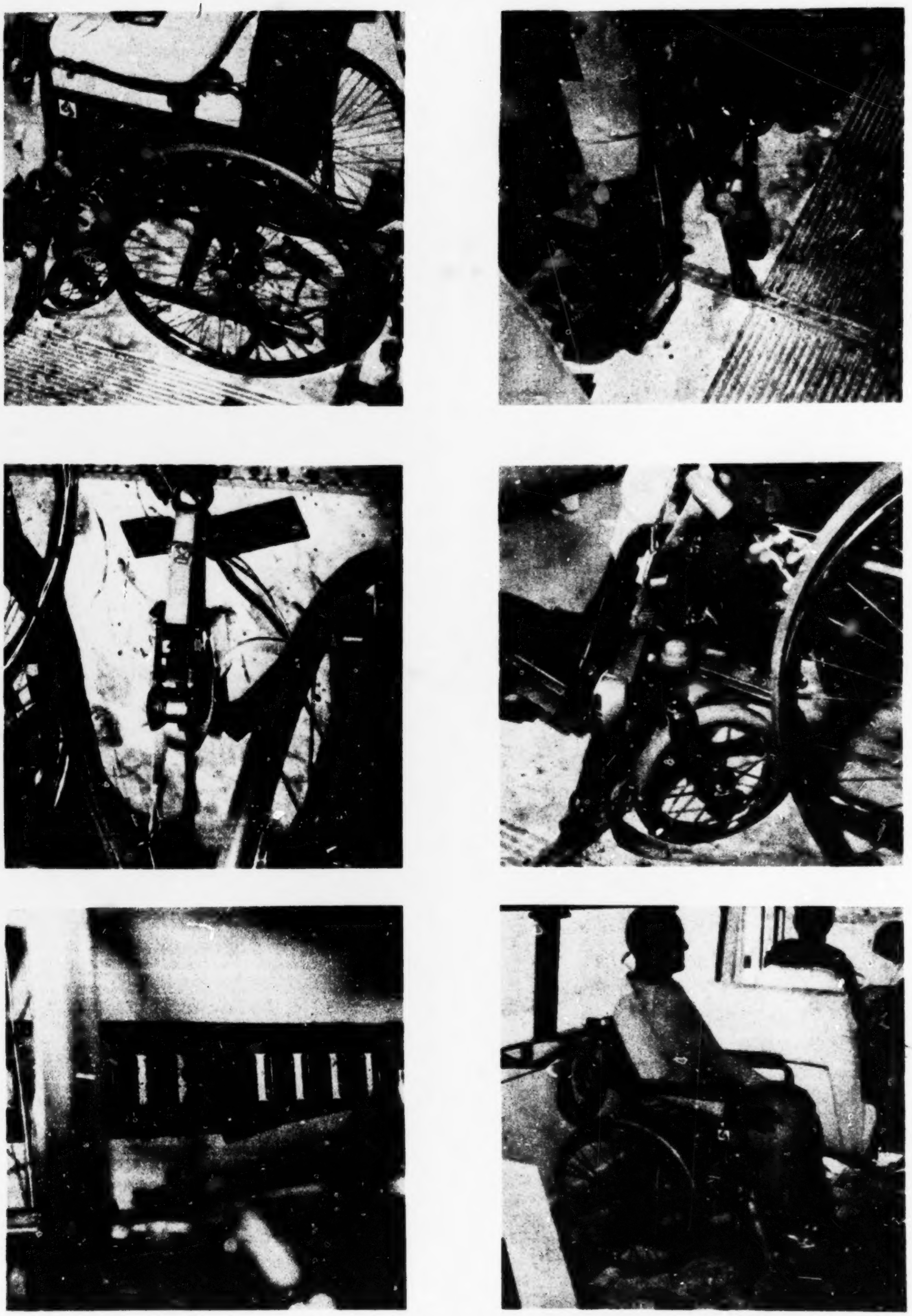


Figure 6 PRE-TEST NO. 6A, WHEELCHAIR TIE-DOWNS

6440-V-4

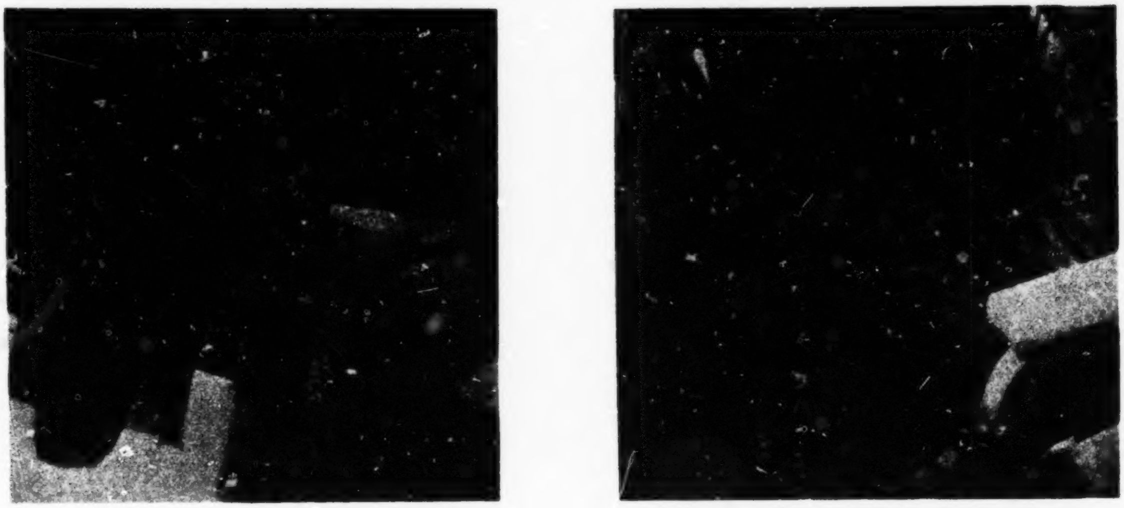
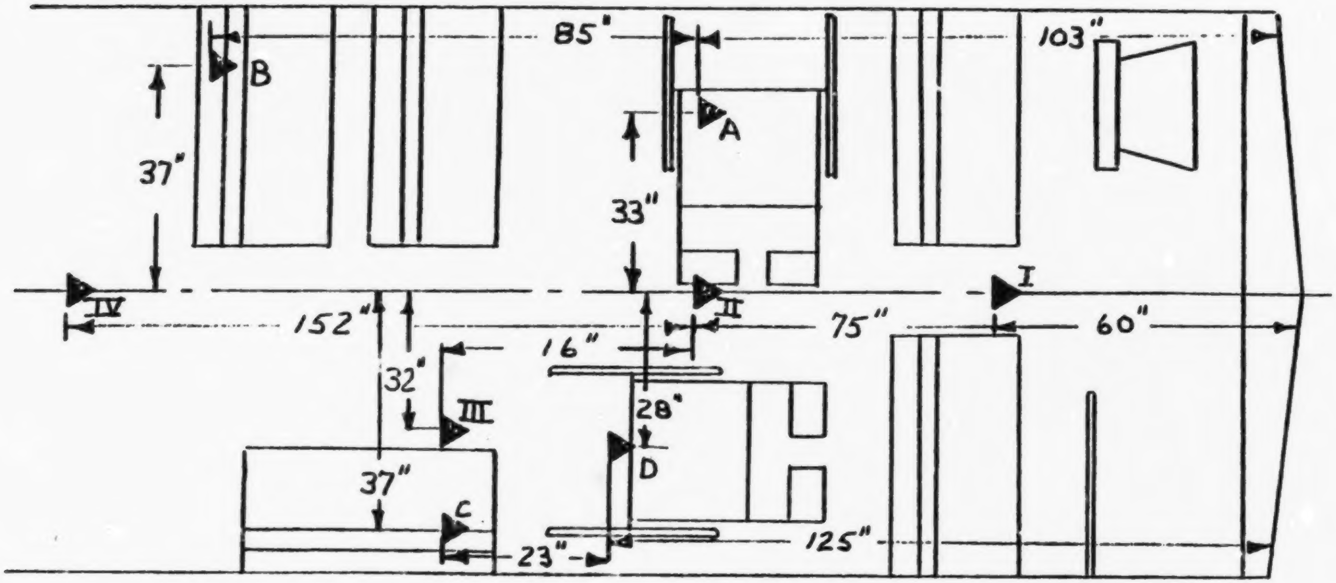


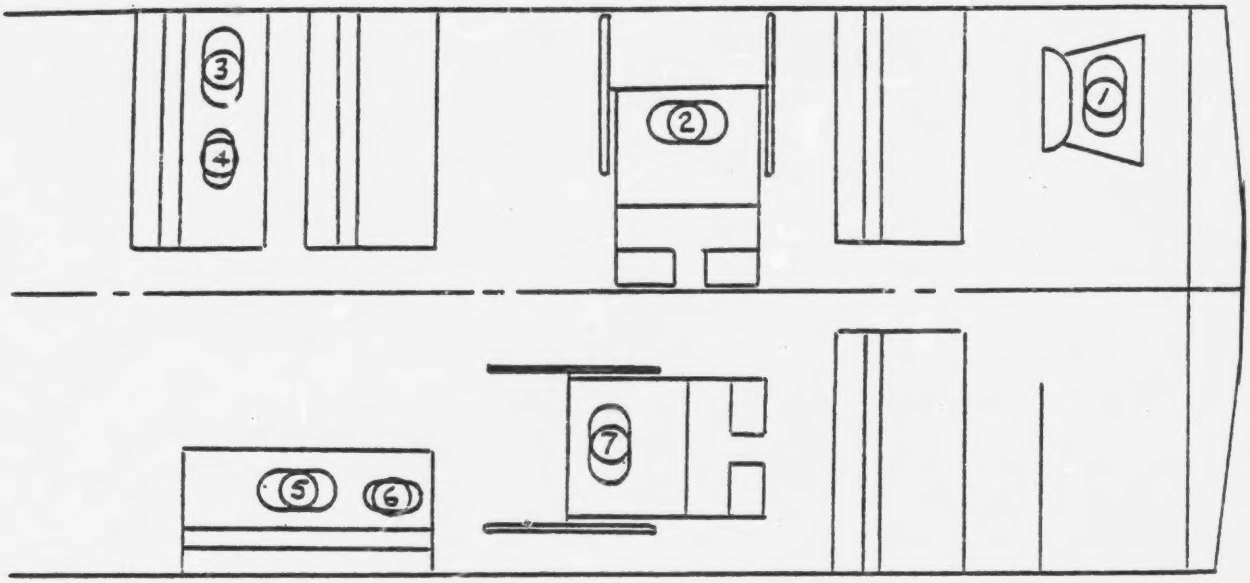
Figure 6 (Continued) WHEELCHAIR TIE-DOWNS USED FOR TEST


85"
103"
B
A
37"
33"
IV
II
I
152"
16"
75"
60"
32"
III
28"
D
37"
C
23"
125"

ACCEL. NO.	ACCEL. COMP.
I	X Y Z
II	X Y Z
III	X Y Z
IV	X Y Z
A	X Z
B	X Z
C	X Z
D	X Z

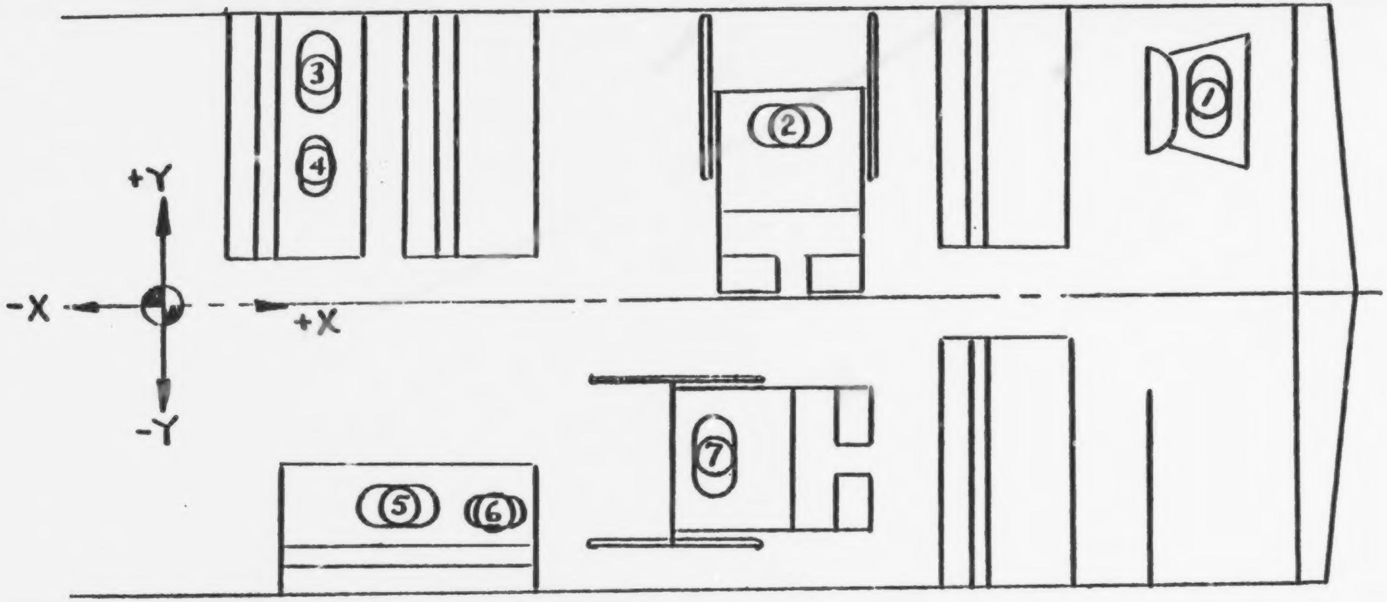
6440-V-4

FIGURE 7 ACCELEROMETER LOCATIONS - TEST NO. 6A - FRONTAL BARRIER



DUMMY	TRANDSUCERS			
POS. & TYPE	HEAD ACCEL.	CHEST ACCEL.	FEMUR LOAD	BELT LOAD
1 50%	X, Y, Z	X, Y, Z	--	RIGHT & LEFT
2 50%	X, Y, Z	X, Y, Z	--	RIGHT & LEFT
3 50%	X, Y, Z	X, Y, Z	RIGHT & LEFT	--
4 6-YR OLD	X, Y, Z	X, Y, Z	--	--
5 50%	X, Y, Z	X, Y, Z	RIGHT & LEFT	--
6 6-YR OLD	X, Y, Z	X, Y, Z		--
7 50%	X, Y, Z	X, Y, Z		RIGHT & LEFT

FIGURE 8 DUMMY SEATING POSITION & INSTRUMENTATION FOR FRONTAL BARRIER TEST NO. 6A

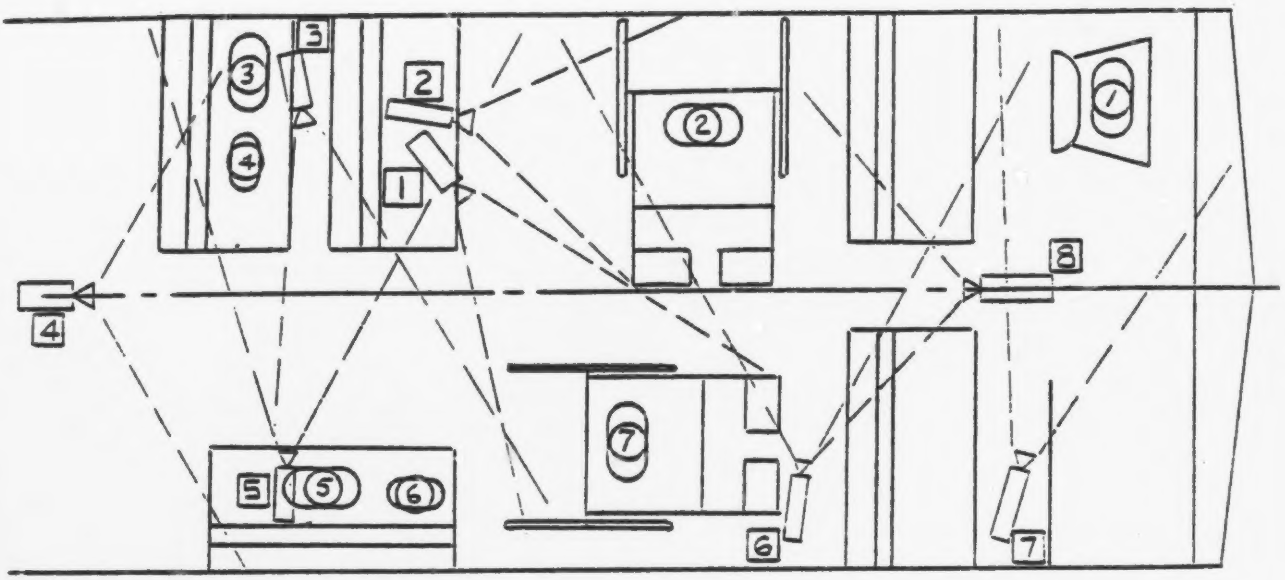


<table>
<tr><th rowspan="2" colspan="2">DUMMY POSITION</th><th colspan="3">HEAD POINT (INCHES)</th><th colspan="3">H POINT (INCHES)</th><th colspan="3">KNEE POINT (INCHES)</th></tr>
<tr><th>X</th><th>Y</th><th>Z</th><th>X</th><th>Y</th><th>Z</th><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td rowspan="2">(1)</td><td>PRE</td><td>179</td><td>-24</td><td>49</td><td>183¼</td><td>-20</td><td>22</td><td>199¼</td><td>17¾</td><td>23</td></tr>
<tr><td>POST</td><td>196</td><td>-23½</td><td>43</td><td>182¼</td><td>-20</td><td>22</td><td>200</td><td>18¾</td><td>21½</td></tr>
<tr><td rowspan="2">(2)</td><td>PRE</td><td>112</td><td>-32¾</td><td>48</td><td>108</td><td>-29¾</td><td>21</td><td>110</td><td>-10¾</td><td>23</td></tr>
<tr><td>POST</td><td>111½</td><td>-12</td><td>38½</td><td>115½</td><td>-28¾</td><td>22</td><td>116¼</td><td>-11¼</td><td>20½</td></tr>
<tr><td rowspan="2">(3)</td><td>PRE</td><td>39</td><td>-30½</td><td>44</td><td>37</td><td>-26½</td><td>19</td><td>51¾</td><td>-27¼</td><td>20½</td></tr>
<tr><td>POST</td><td>43</td><td>-13½</td><td>42½</td><td>39½</td><td>-13½</td><td>18</td><td>53½</td><td>-13½</td><td>19</td></tr>
<tr><td rowspan="2">(4)</td><td>PRE</td><td>36½</td><td>-18¼</td><td>35½</td><td>37</td><td>-16½</td><td>17</td><td>46</td><td>-17¾</td><td>18</td></tr>
<tr><td>POST</td><td>35½</td><td>16</td><td>½</td><td>45</td><td>-4½</td><td>1½</td><td>55</td><td>-4¾</td><td>0</td></tr>
<tr><td rowspan="2">(5)</td><td>PRE</td><td>50½</td><td>34½</td><td>44</td><td>44¼</td><td>31¾</td><td>18½</td><td>45</td><td>15¼</td><td>20</td></tr>
<tr><td>POST</td><td>101</td><td>24</td><td>27½</td><td>85</td><td>1</td><td>21½</td><td>95¾</td><td>-3</td><td>7</td></tr>
<tr><td rowspan="2">(6)</td><td>PRE</td><td>66¾</td><td>35¼</td><td>38</td><td>64¾</td><td>29½</td><td>18</td><td>64</td><td>19½</td><td>19½</td></tr>
<tr><td>POST</td><td>88</td><td>31¼</td><td>23½</td><td>75</td><td>13</td><td>17</td><td>85</td><td>11¼</td><td>10¼</td></tr>
<tr><td rowspan="2">(7)</td><td>PRE</td><td>103</td><td>25¼</td><td>48</td><td>100½</td><td>18½</td><td>21</td><td>118</td><td>20½</td><td>24</td></tr>
<tr><td>POST</td><td>134</td><td>24¼</td><td>38¼</td><td>111¾</td><td>17¼</td><td>22</td><td>129</td><td>19½</td><td>18½</td></tr>
</table>

FIGURE 9 DUMMY LOCATIONS PRE- AND POST-TEST NO. 6A

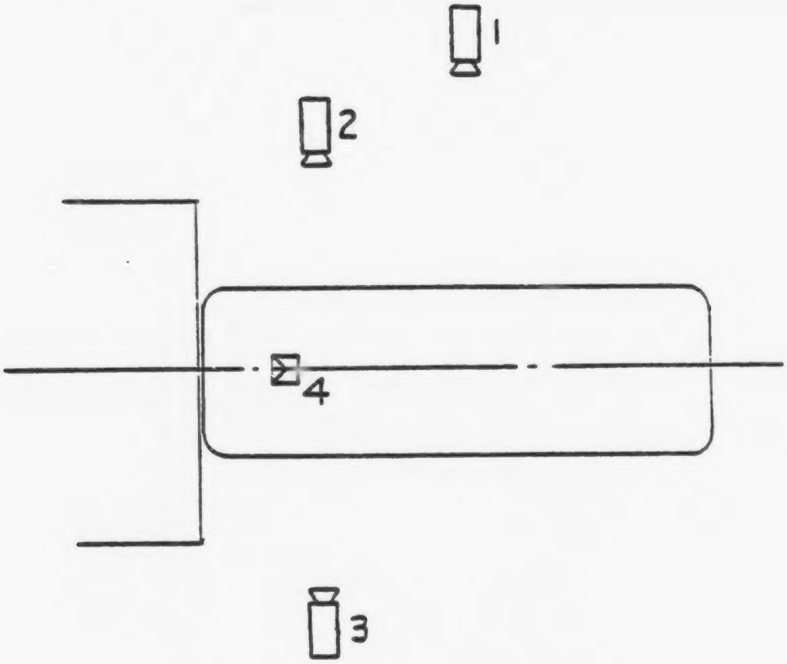
6440-V-4

341



LOCATION NO.	TYPE	LENS (MM)	SPEED (FPS)
1	PHOTOSONIC	8	500
2	PHOTOSONIC	8	475
3	STALEX	8	600
4	STALEX	8	900
5	STALEX	8	600
6	STALEX	8	550
7	STALEX	8	700
8	STALEX	8	800

FIGURE 10 ON-BOARD CAMERA COVERAGE FOR TEST NO. 6A



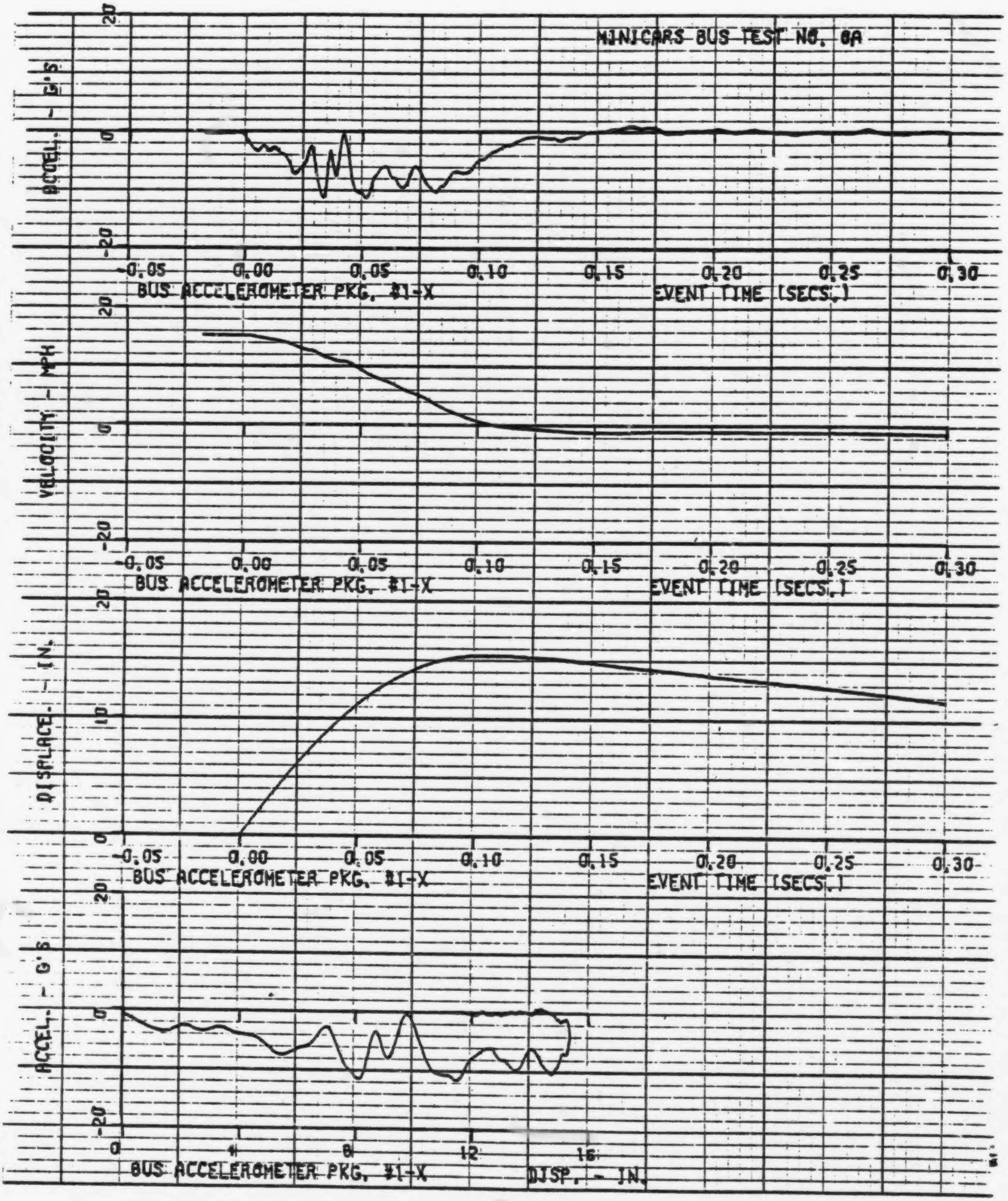
LOC. NO.	LOCATION	CAMERA TYPE	LENS (MM)	SPEED (FPS)
1	SOUTH WIDE	PHOTOSONIC	13	500
2	SOUTH CLOSE	PHOTOSONIC	25	700
3	NORTH CLOSE	PHOTOSONIC	25	550
4	PIT	PHOTOSONIC	13	No Pulse

FIGURE 11 OFF-BOARD CAMERA COVERAGE FOR TEST NO. 6A

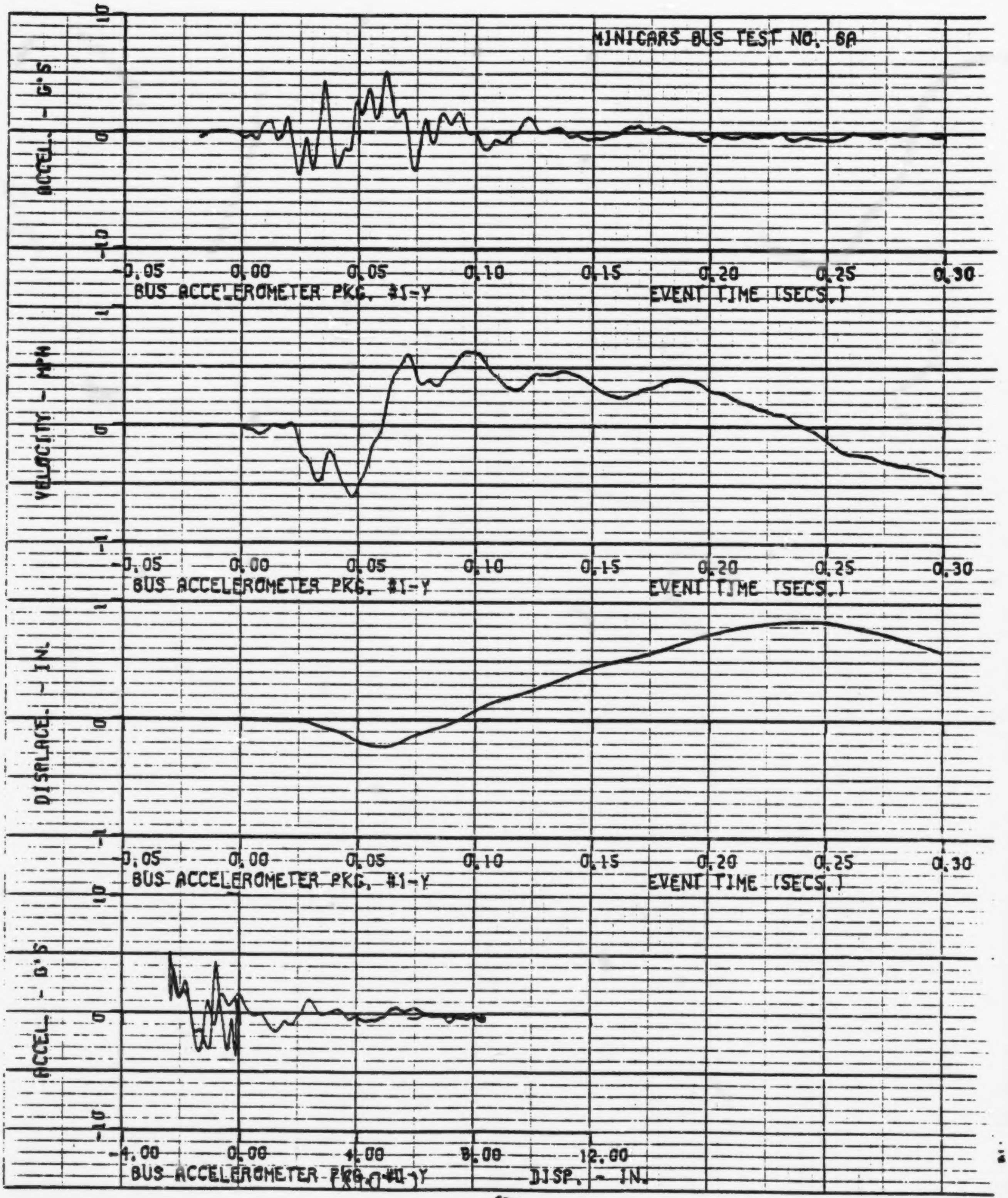
BLANK PAGE

TEST NO. 6A DATA

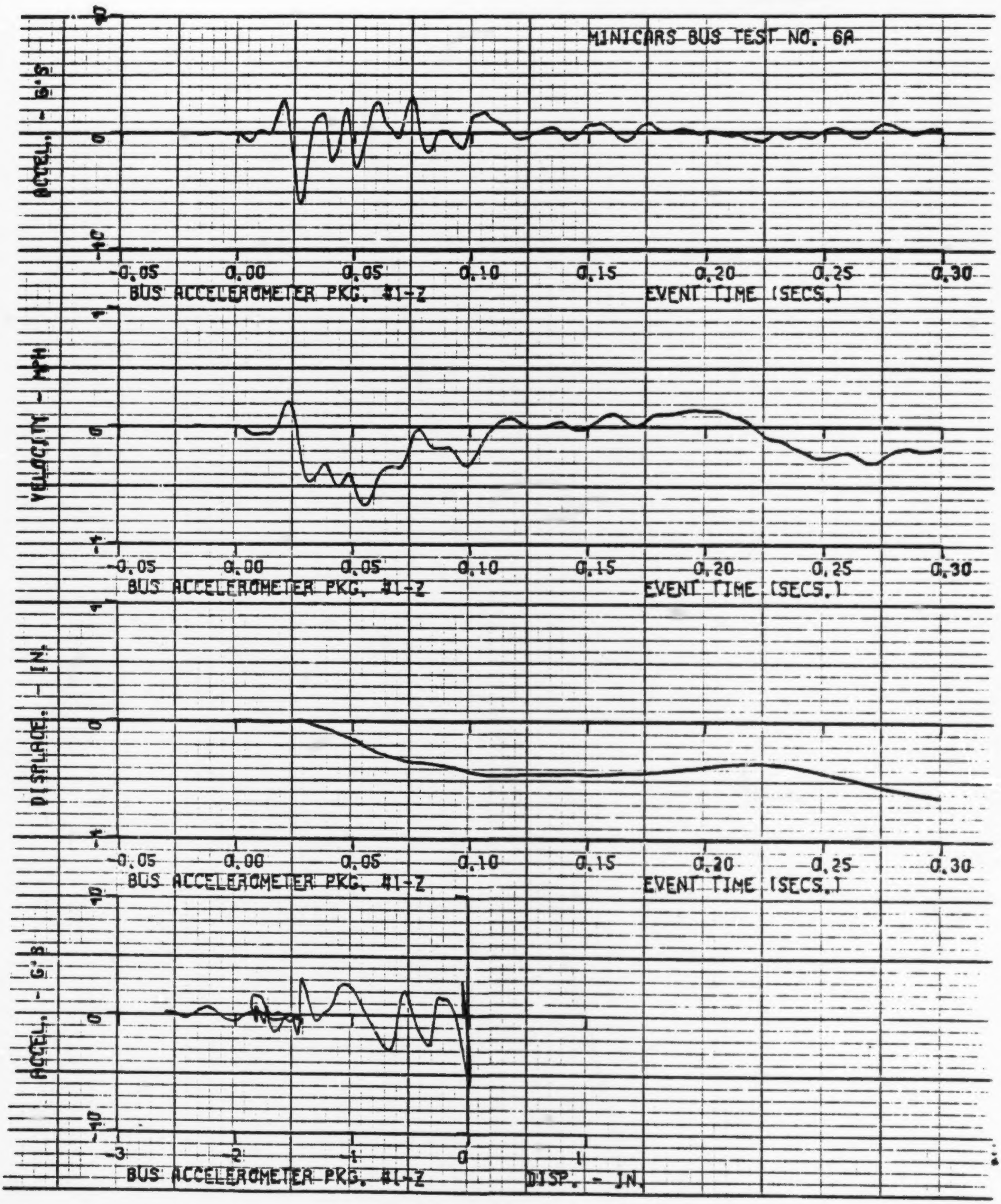
	FILTER CHANNEL CLASS
VEHICLE DATA	60
HEAD ACCELERATION	1000
CHEST ACCELERATION	180
BELT LOADS	60
FEMUR LOADS	600


MINICARS BUS TEST NO. 8A
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-X
EVENT TIME (SECS.)
VELOCITY - MPH
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-X
EVENT TIME (SECS.)
DISPLACE. - IN.
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-X
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
0
4
8
12
16
BUS ACCELEROMETER PKG. #1-X
DISP. - IN.

6440-V-4

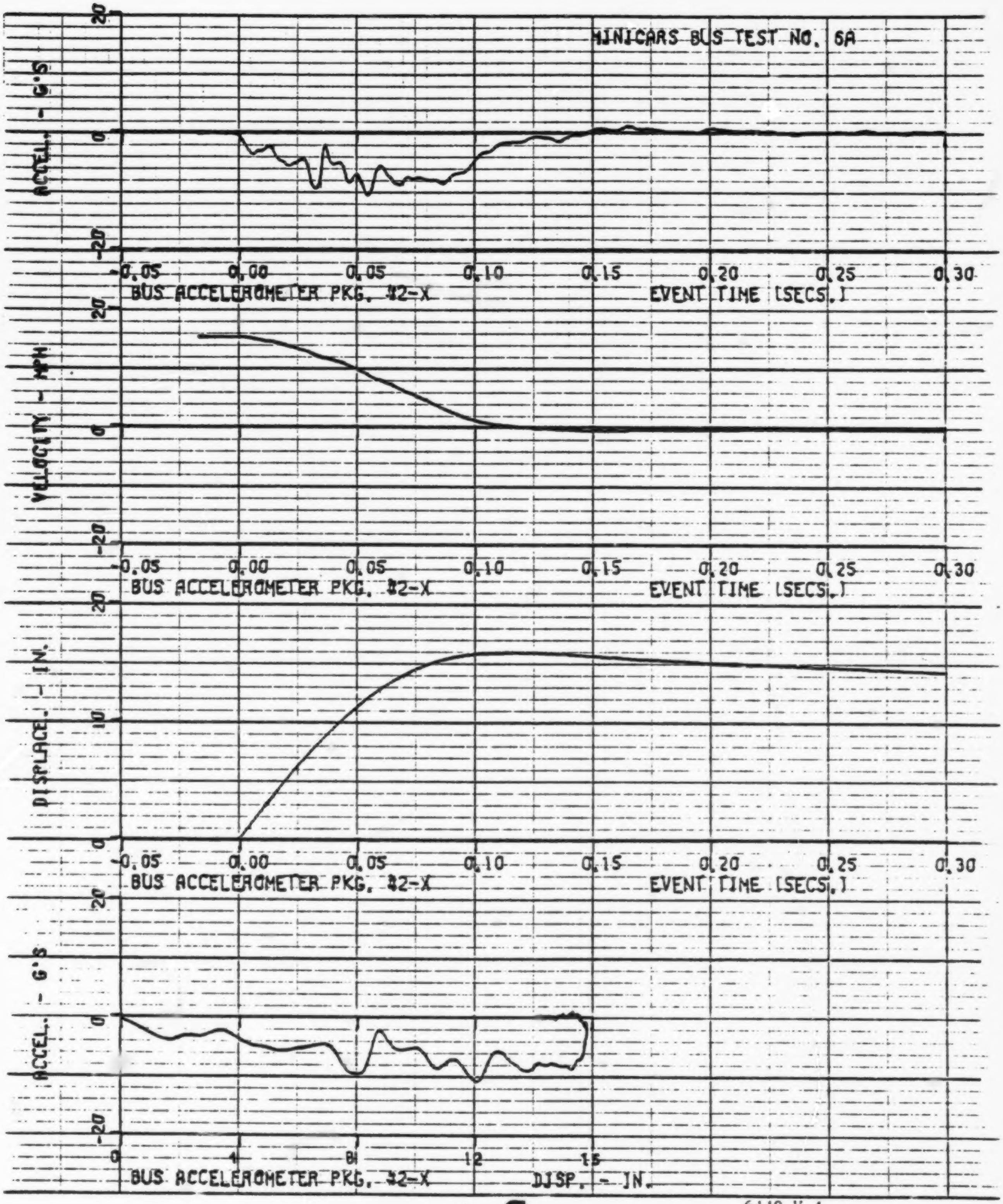

MINICARS BUS TEST NO. 6A
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Y
EVENT TIME (SECS.)
VELOCITY - MPH
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Y
EVENT TIME (SECS.)
DISPLACE. - IN.
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Y
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-4.00
0.00
4.00
8.00
12.00
BUS ACCELEROMETER PKG. #1-Y
DISP. - IN.

6440-V-4

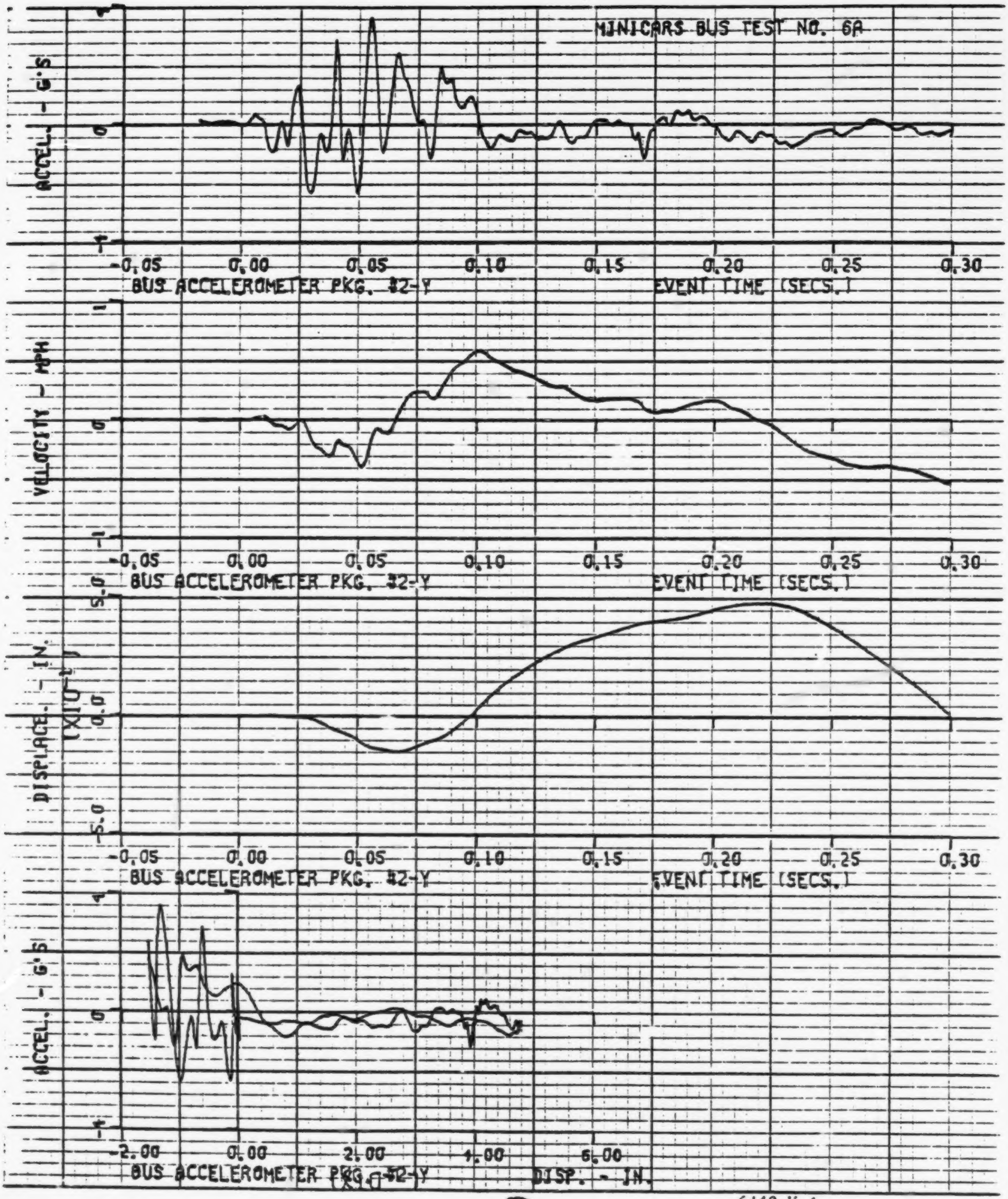

MINICARS BUS TEST NO. 6A
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Z
EVENT TIME (SECS.)
VELOCITY - MPH
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Z
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-3
-2
-1
0
1
BUS ACCELEROMETER PKG. #1-Z
DISP. - IN.

348

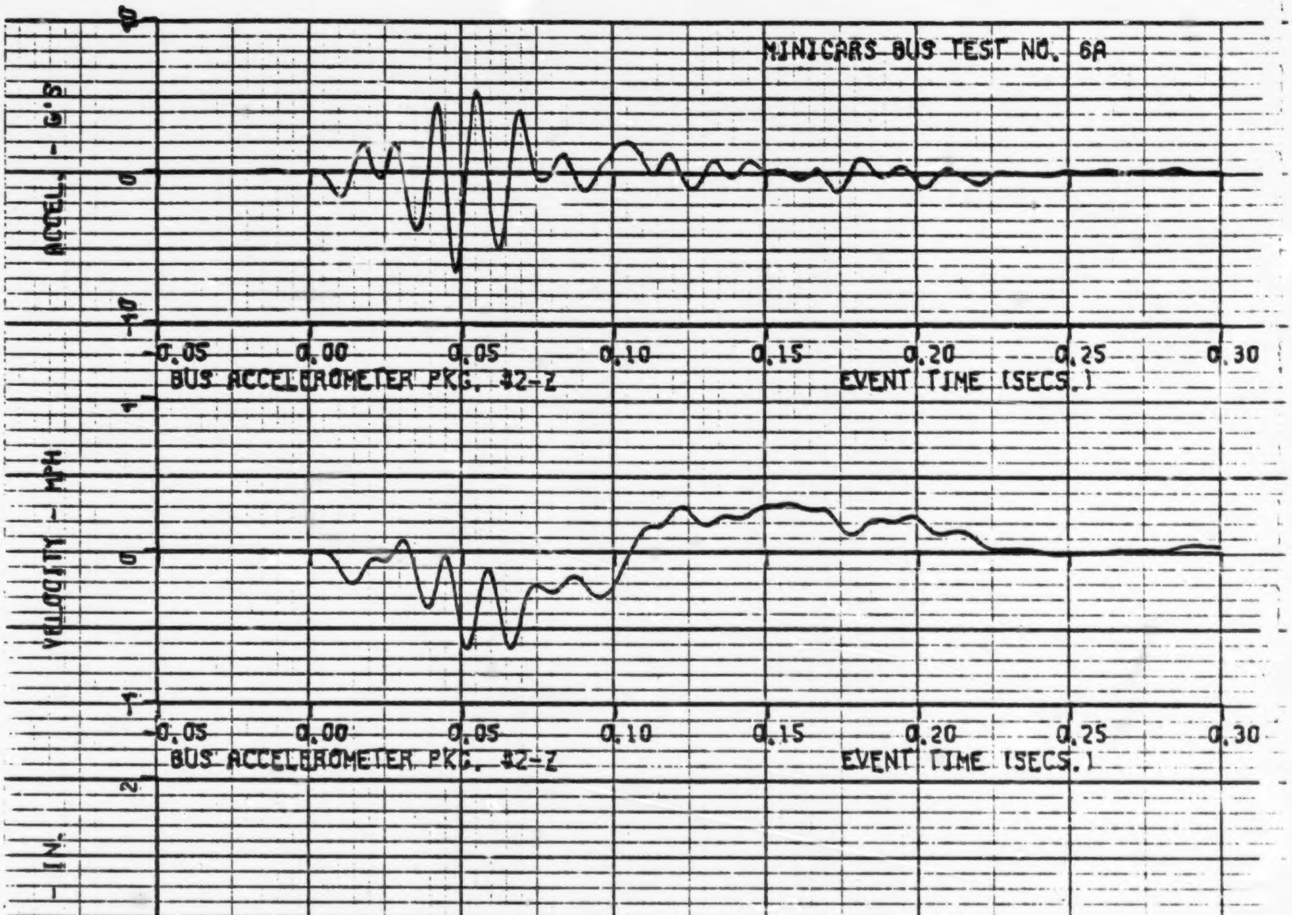
6440-V-4


MINICARS BUS TEST NO. 6A
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-X
EVENT TIME (SECS.)
VELOCITY - MPH
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-X
EVENT TIME (SECS.)
DISPLACE. - IN.
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-X
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
0
4
8
12
16
BUS ACCELEROMETER PKG. #2-X
DISP. - IN.

6440-V-4

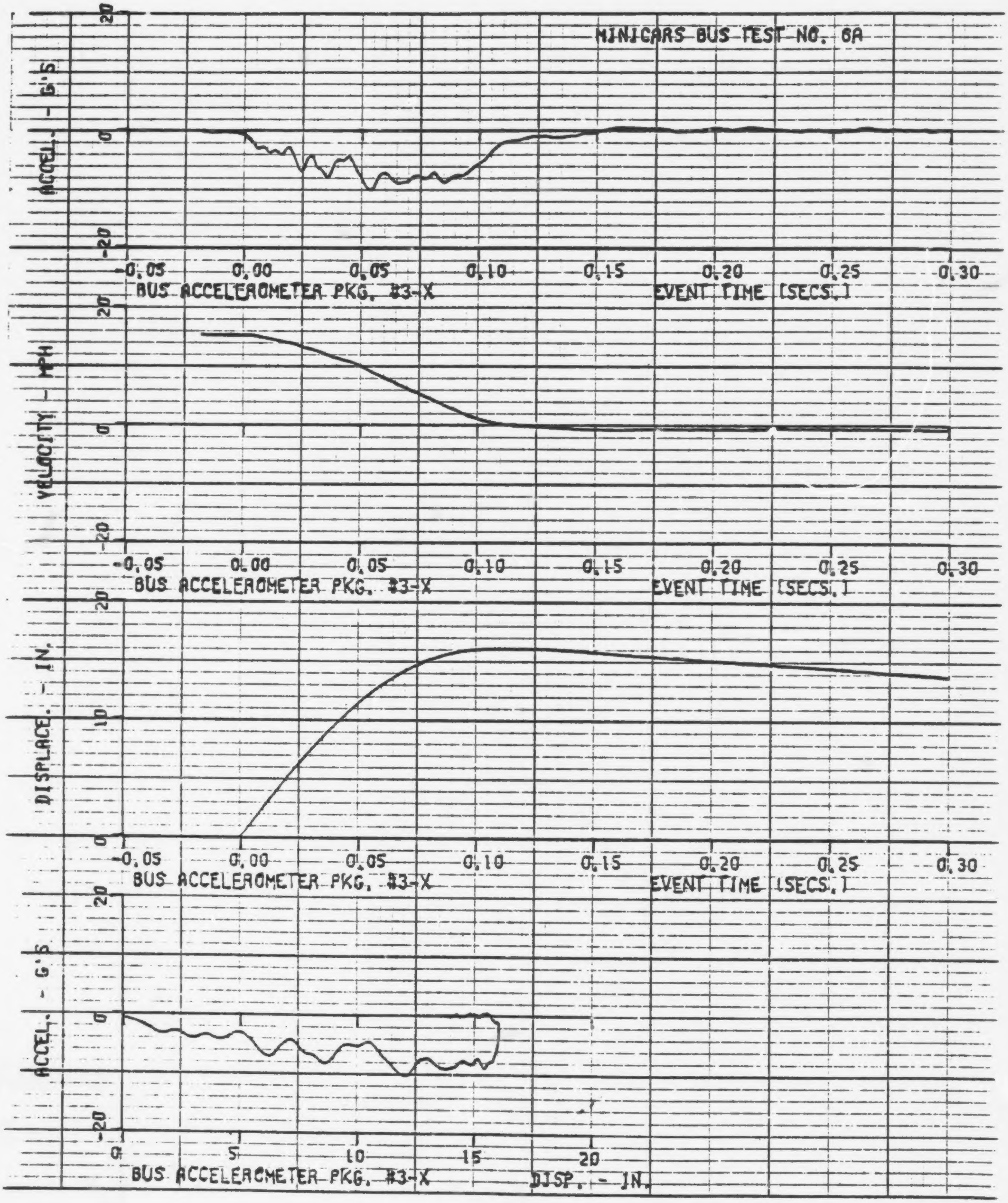

MINICARS BUS TEST NO. 6A
ACCEL. - G'S
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-Y
EVENT TIME (SECS.)
VELOCITY - MPH
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-Y
EVENT TIME (SECS.)
DISPLACE. - IN.
(X10^-1)
5.0
0.0
-5.0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-Y
EVENT TIME (SECS.)
ACCEL. - G'S
1
0
-1
-2.00
0.00
2.00
4.00
6.00
BUS ACCELEROMETER PKG. #2-Y
(X10^-1)
DISP. - IN.

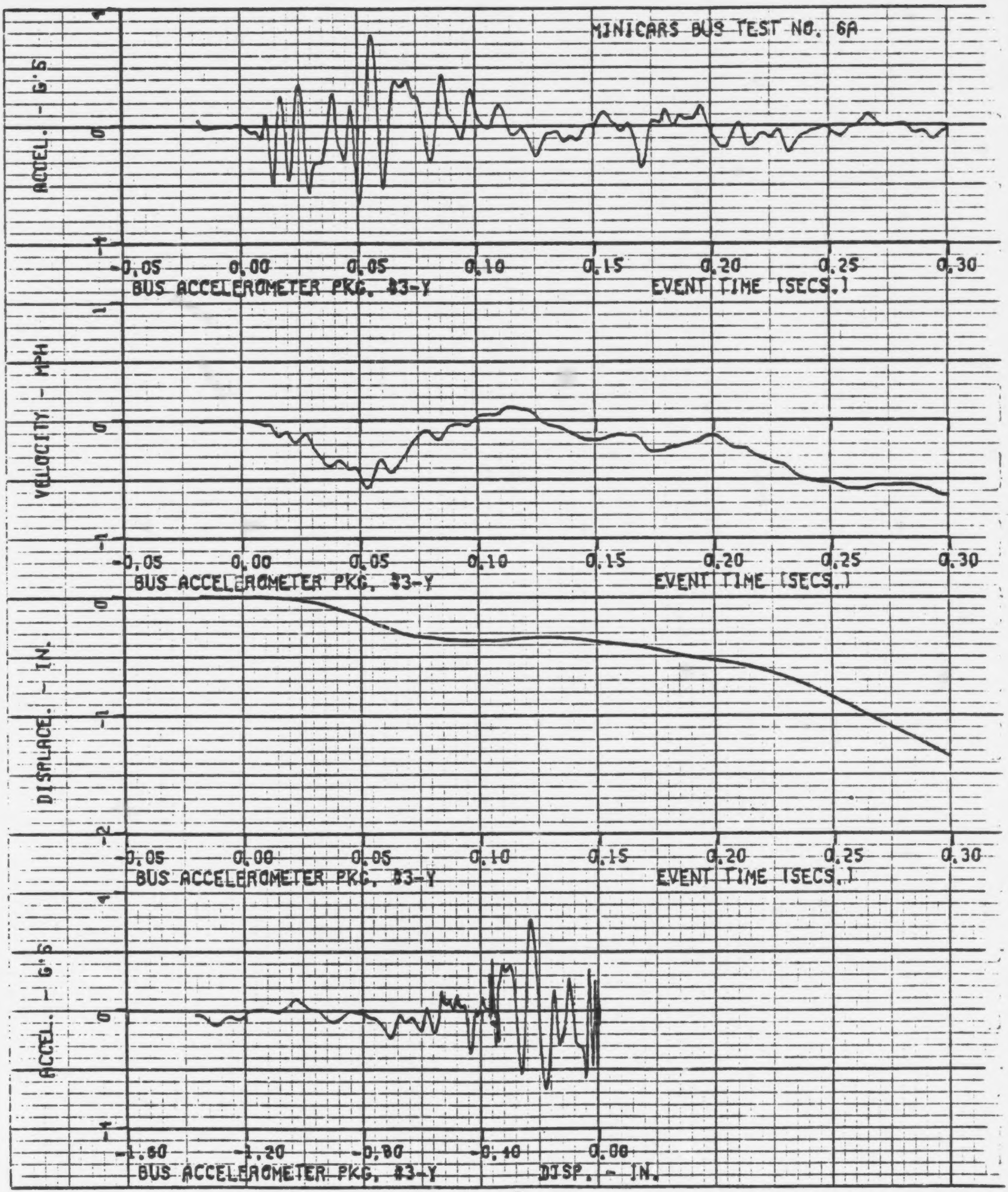
6440-V-4


MINICARS BUS TEST NO. 6A
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-Z
EVENT TIME (SECS.)
VELOCITY - MPH
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-Z
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-2
-1
0
1
2
BUS ACCELEROMETER PKG. #2-Z
DISP. - IN.

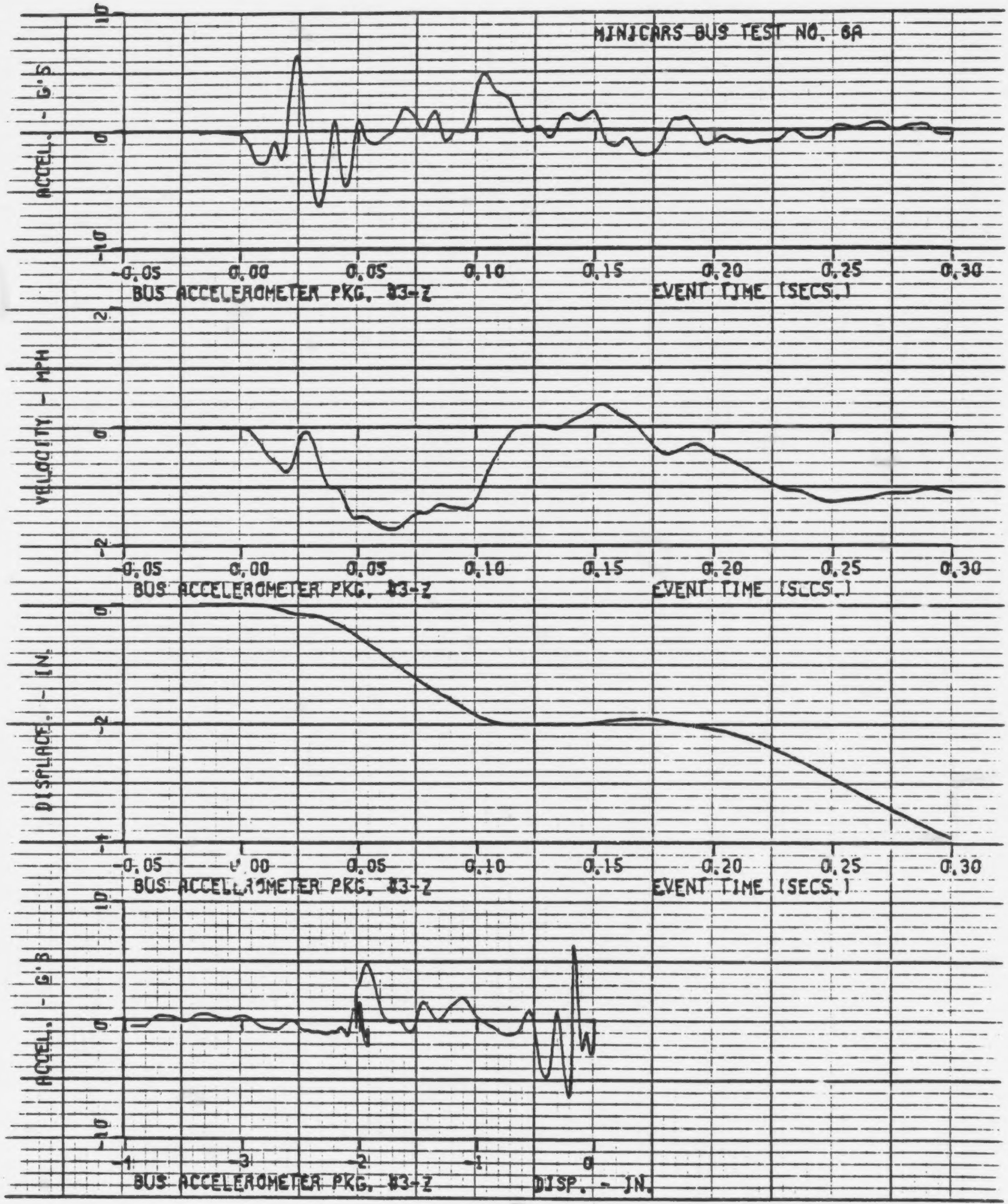
351

6440-V-4

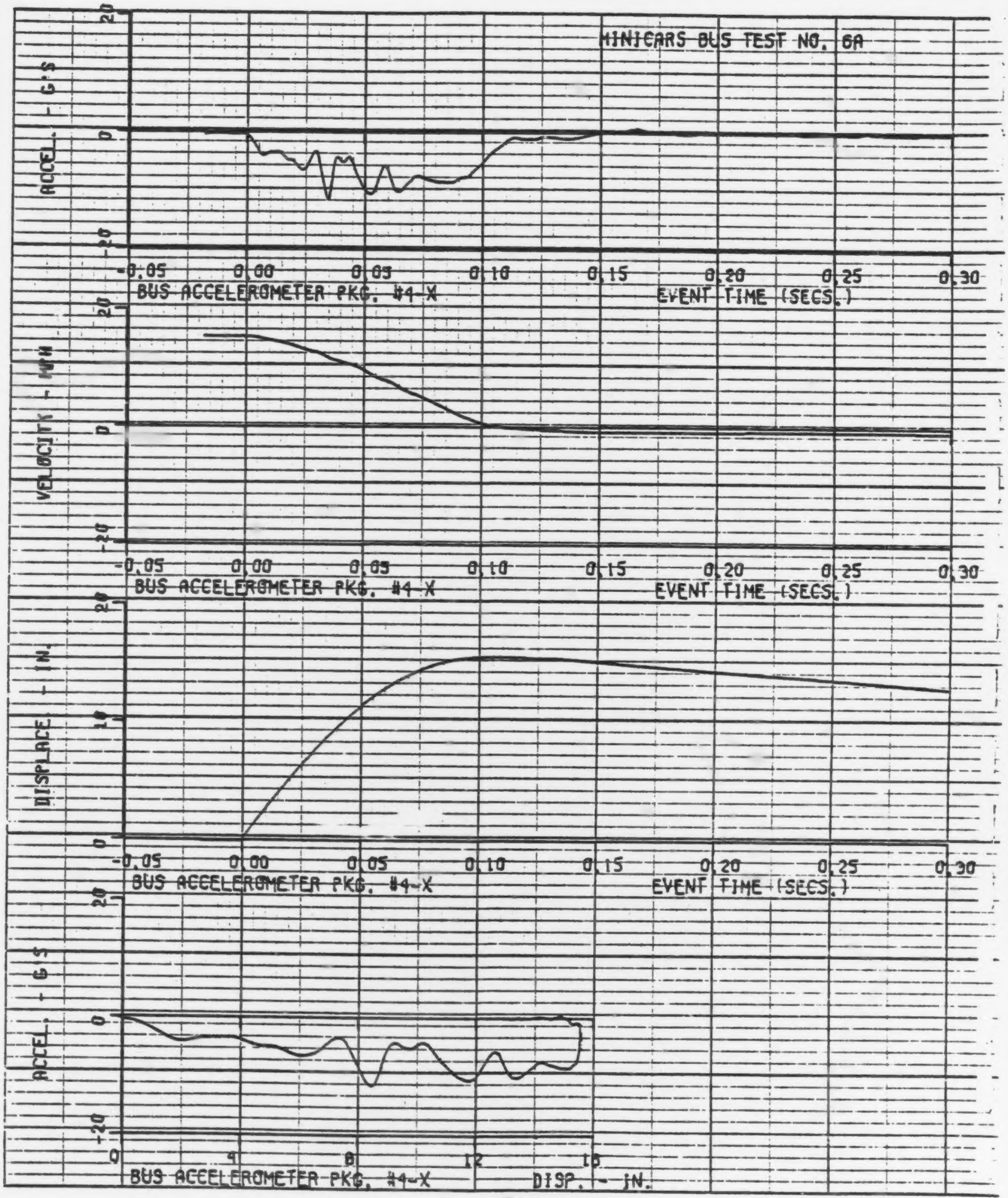

MINICARS BUS TEST NO. 6A
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-X
EVENT TIME [SECS.]
VELOCITY - MPH
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-X
EVENT TIME [SECS.]
DISPLACE. - IN.
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-X
EVENT TIME [SECS.]
ACCEL. - G'S
20
0
-20
0
5
10
15
20
BUS ACCELEROMETER PKG. #3-X
DISP. - IN.


MINICARS BUS TEST NO. 6A
ACCEL. - G'S
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-Y
EVENT TIME (SECS.)
VELOCITY - MPH
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-Y
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-1
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-Y
EVENT TIME (SECS.)
ACCEL. - G'S
1
0
-1
-1.60
-1.20
-0.80
-0.40
0.00
BUS ACCELEROMETER PKG. #3-Y
DISP. - IN.

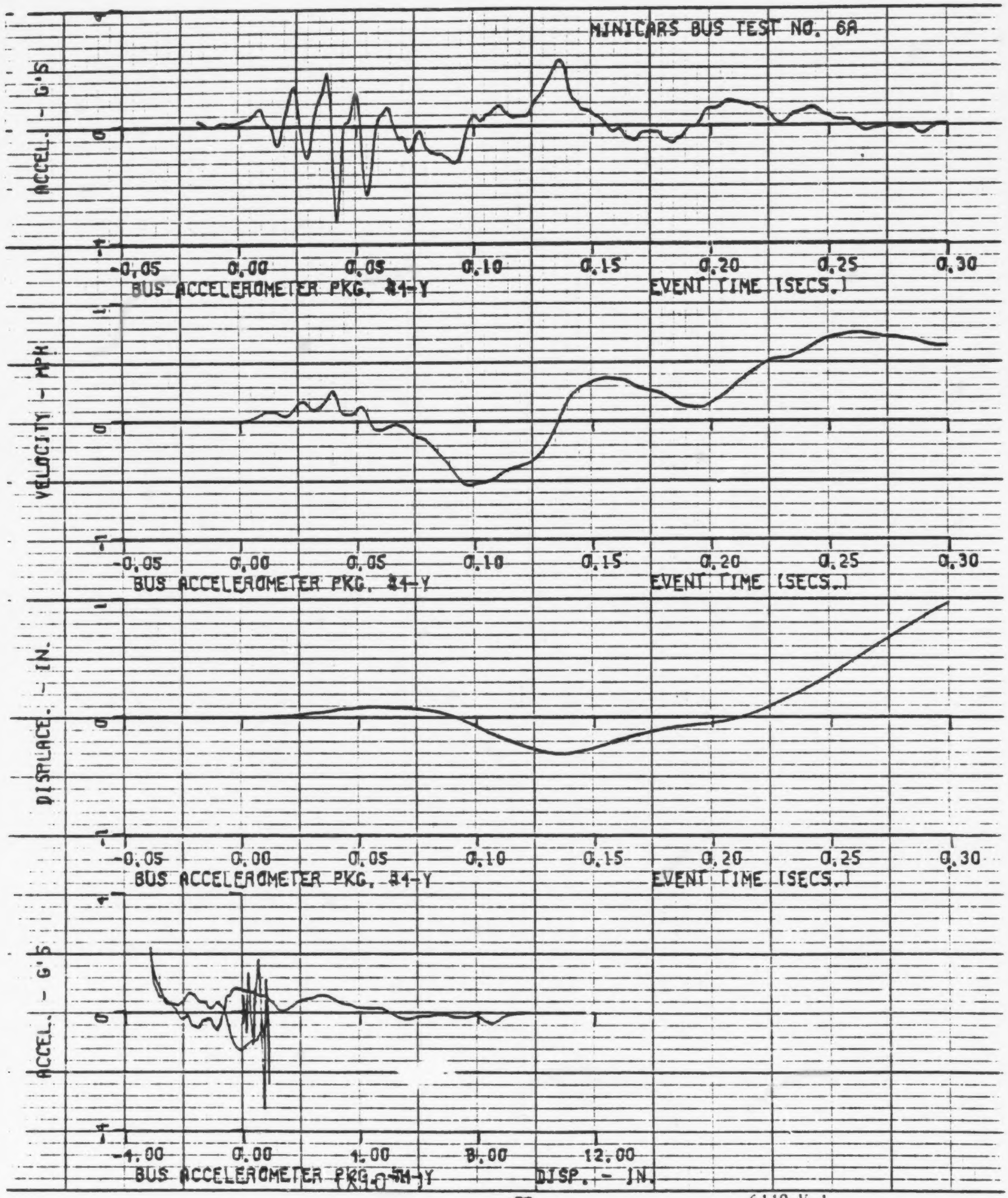
6440-V-4


MINICARS BUS TEST NO. 6A
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-Z
EVENT TIME (SECS.)
VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-2
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-Z
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-4
-3
-2
-1
0
BUS ACCELEROMETER PKG. #3-Z
DISP. - IN.

6440-V-4

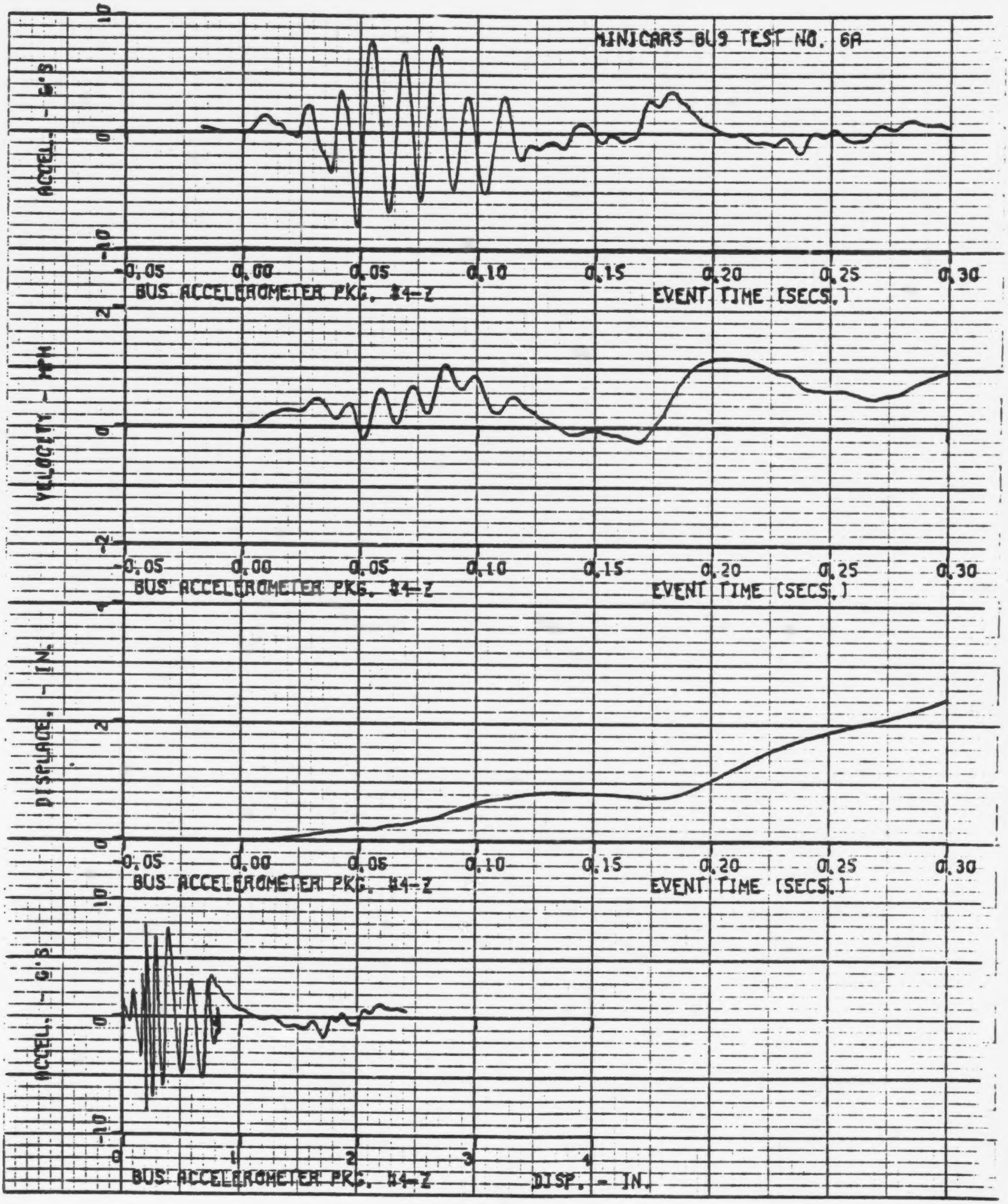

MINICARS BUS TEST NO. 6A
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-X
EVENT TIME (SECS.)
VELOCITY - MPH
20
0
-20
BUS ACCELEROMETER PKG. #4-X
EVENT TIME (SECS.)
DISPLACE - IN.
20
10
0
BUS ACCELEROMETER PKG. #4-X
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
0
4
8
12
16
BUS ACCELEROMETER PKG. #4-X
DISP. - IN.

6440-V-4


MINICARS BUS TEST NO. 6A
ACCEL. - G'S
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. 34-Y
EVENT TIME (SECS.)
VELOCITY - MPH
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. 34-Y
EVENT TIME (SECS.)
DISPLACE. - IN.
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. 34-Y
EVENT TIME (SECS.)
ACCEL. - G'S
1
0
-1
-4.00
0.00
4.00
8.00
12.00
BUS ACCELEROMETER PKG. 34-Y
(X10 -1)
DISP. - IN.

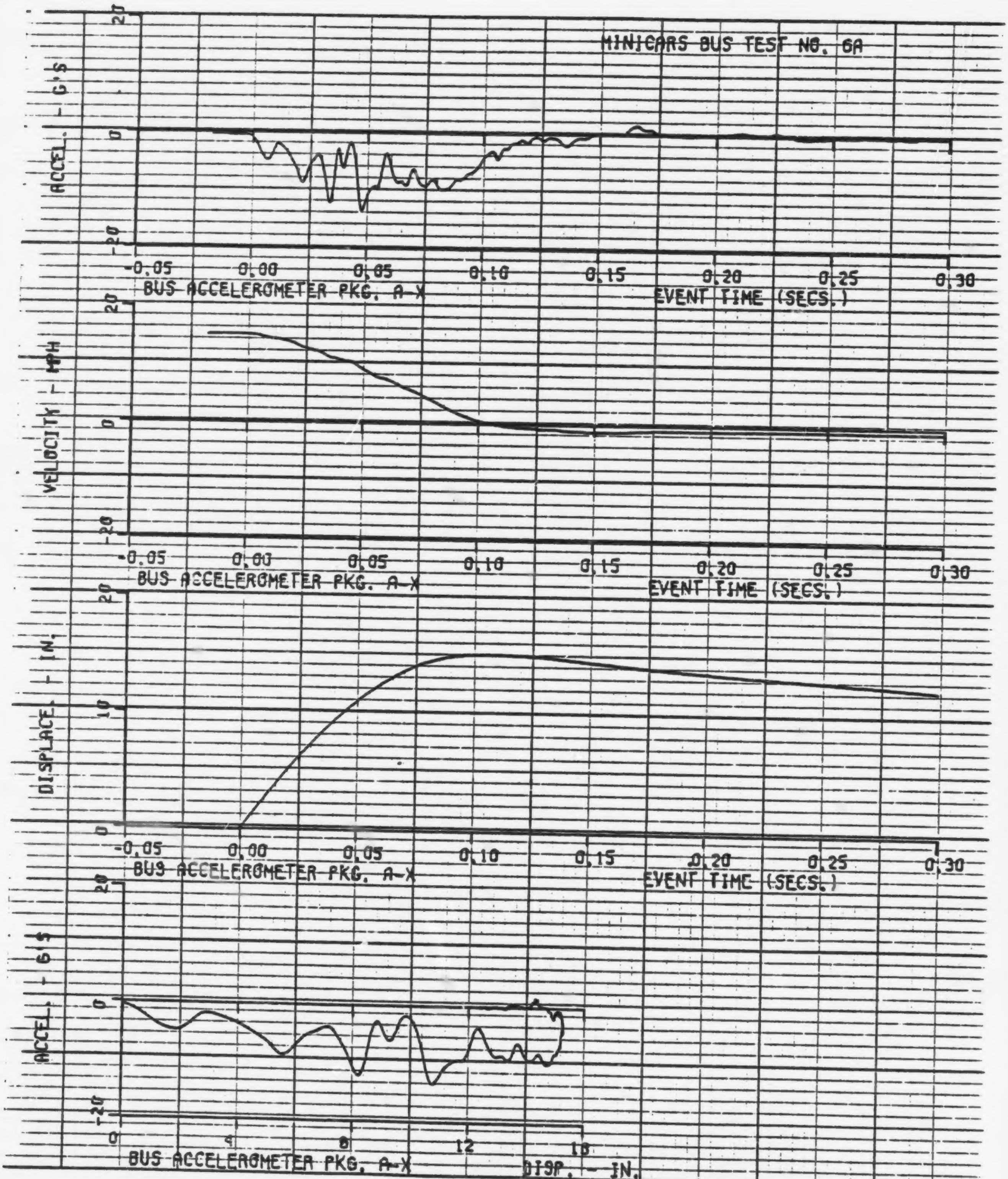
6440-V-4

356


MINICARS BUS TEST NO. 6A
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-Z
EVENT TIME (SECS.)
VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
4
2
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-Z
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
0
1
2
3
4
BUS ACCELEROMETER PKG. #4-Z
DISP. - IN.

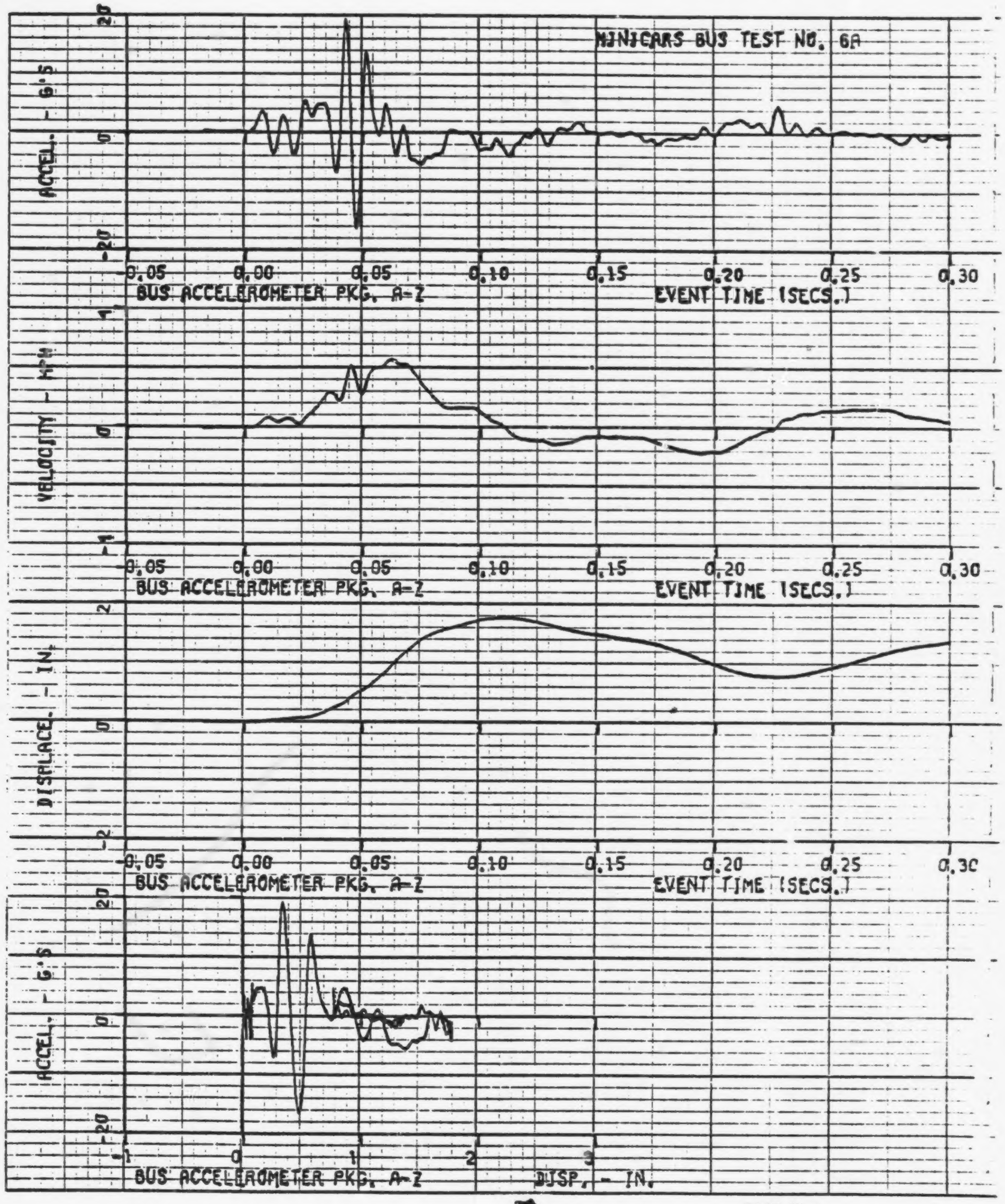
6440-V-4

357

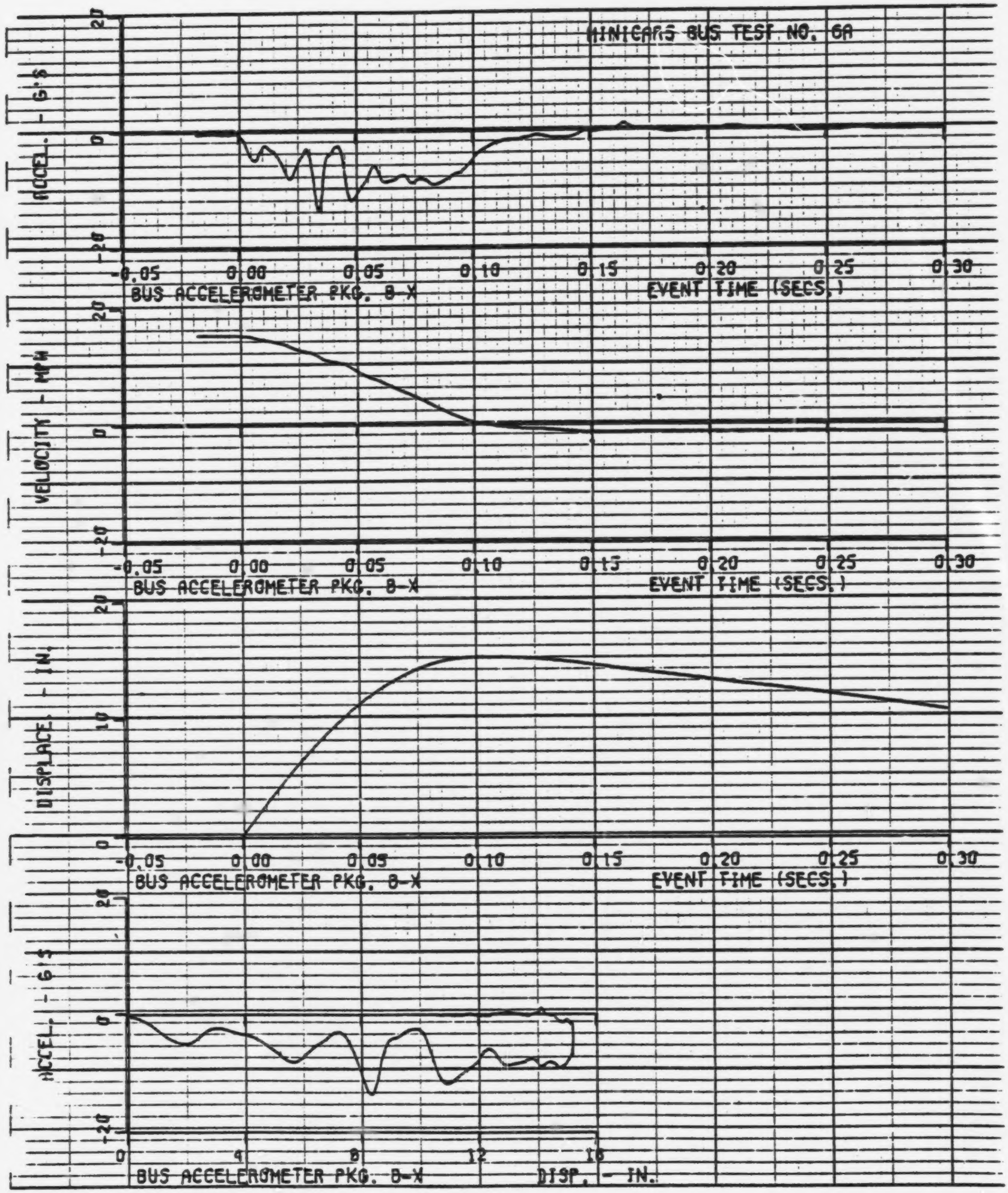

MINICARS BUS TEST NO. 6A
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-X
EVENT TIME (SECS.)
VELOCITY - MPH
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-X
EVENT TIME (SECS.)
DISPLACE. - IN.
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-X
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
0
4
8
12
16
BUS ACCELEROMETER PKG. A-X
DISP. - IN.

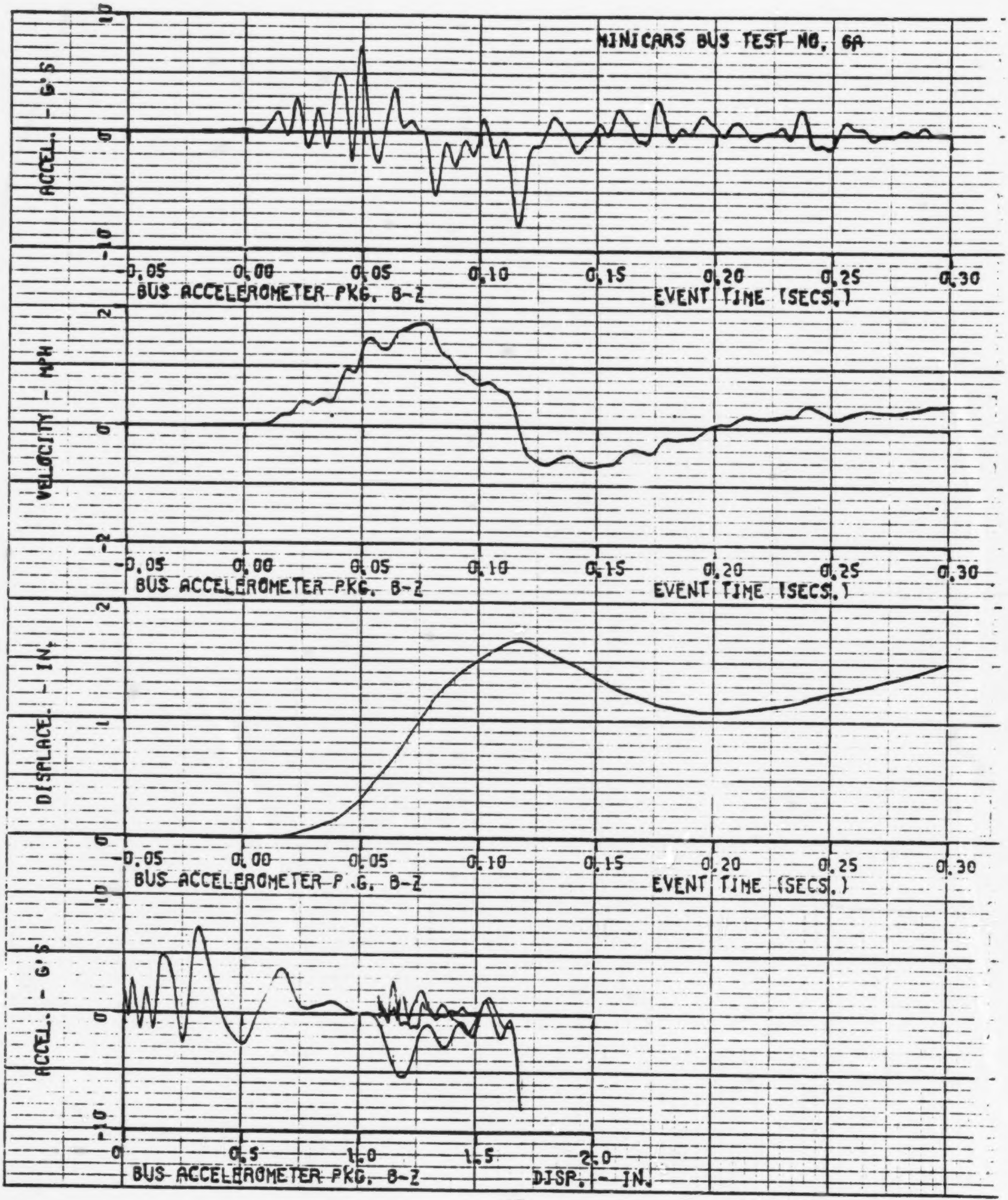
6440-V-4

358

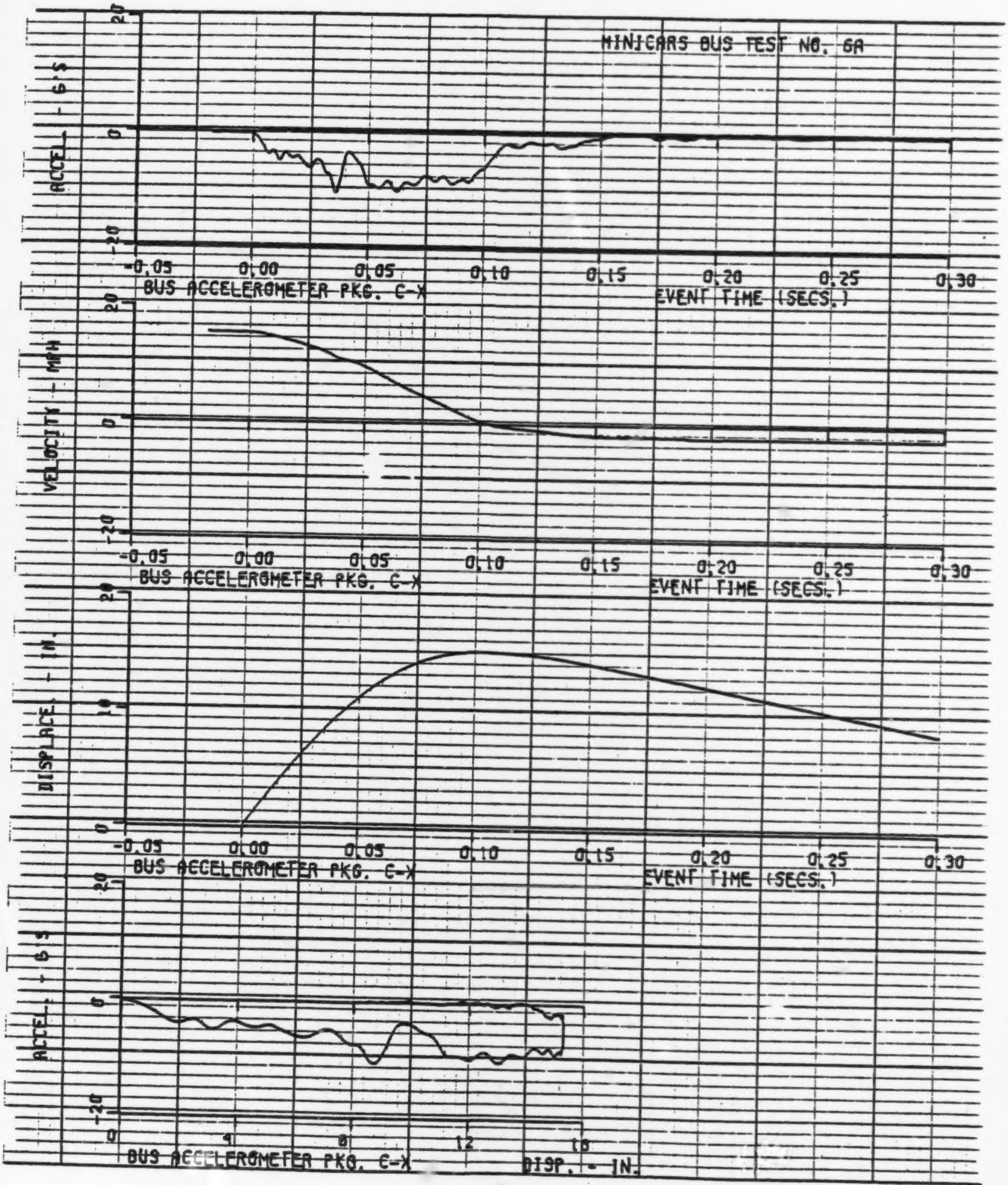

MINICARS BUS TEST NO. 6A
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-Z
EVENT TIME (SECS.)
VELOCITY - MPH
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-Z
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-1
0
1
2
3
BUS ACCELEROMETER PKG. A-Z
DISP. - IN.

6440-V-4


MINICARS BUS TEST NO. 6A
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. 8-X
EVENT TIME (SECS.)
VELOCITY - MPH
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. 8-X
EVENT TIME (SECS.)
DISPLACE. - IN.
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. 8-X
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
0
4
8
12
16
BUS ACCELEROMETER PKG. 8-X
DISP. - IN.

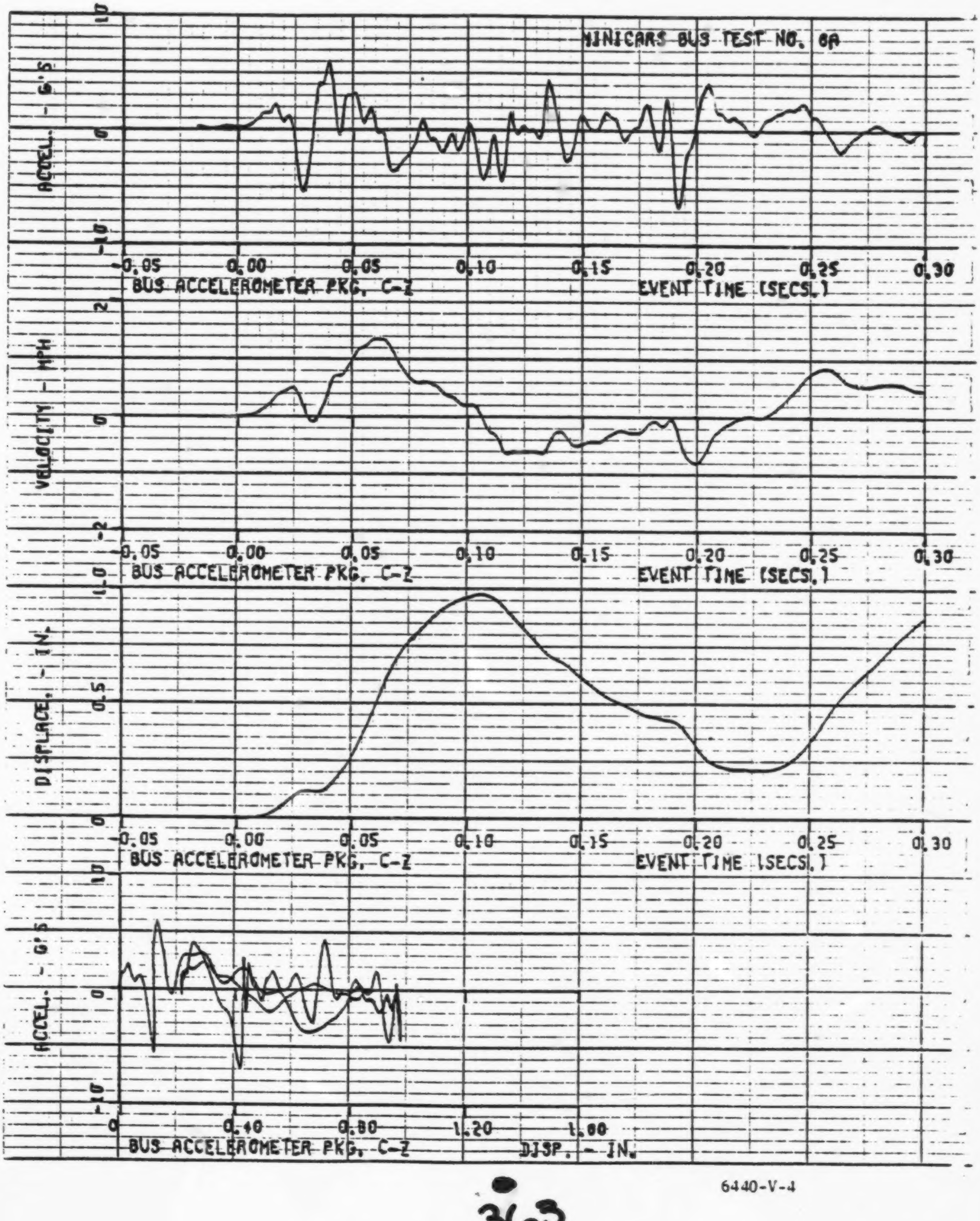

MINICARS BUS TEST NO. 6A
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. B-Z
EVENT TIME (SECS.)
VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. B-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
2
1
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. B-Z
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
0
0.5
1.0
1.5
2.0
BUS ACCELEROMETER PKG. B-Z
DISP. - IN.

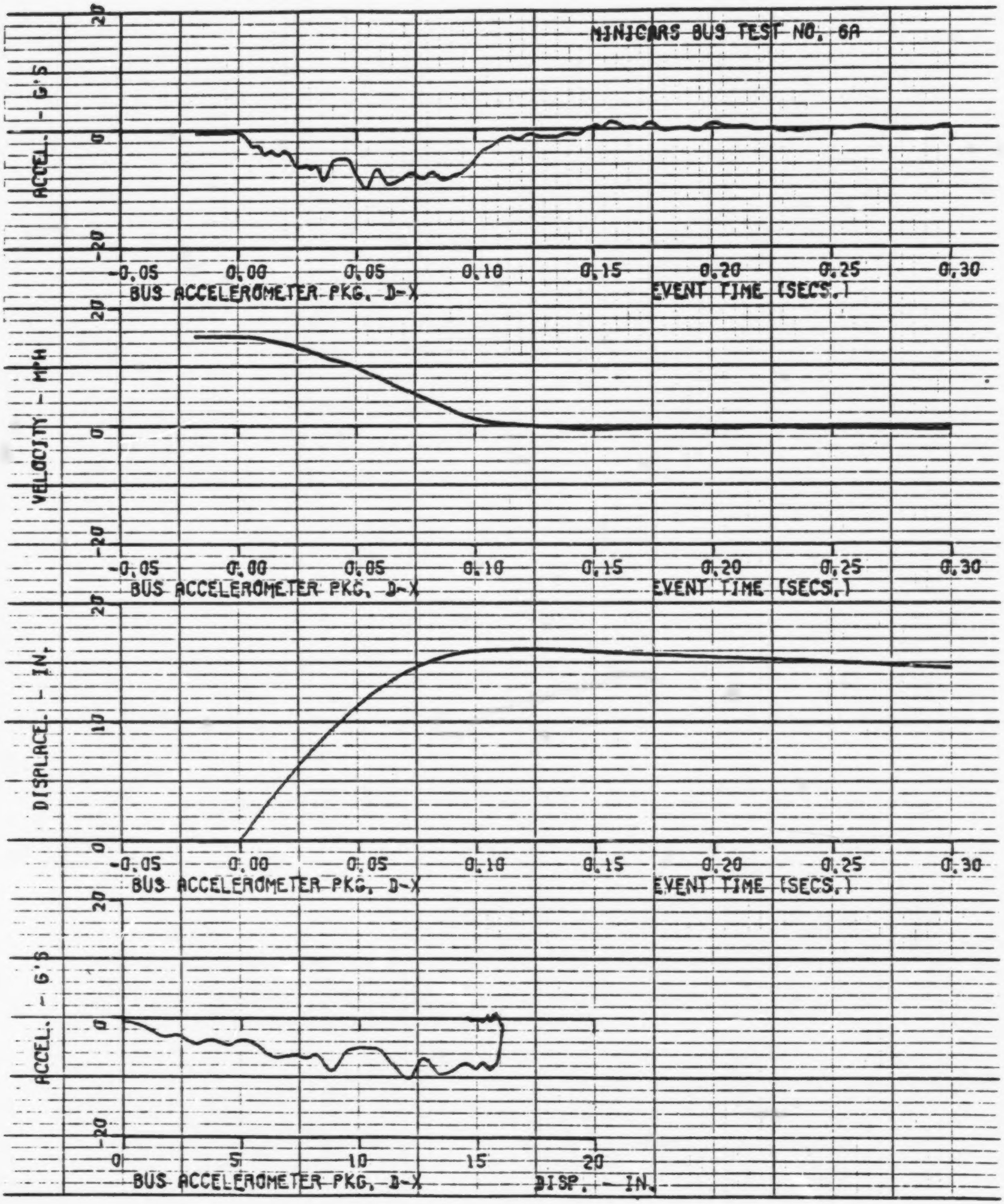
6440-V-4

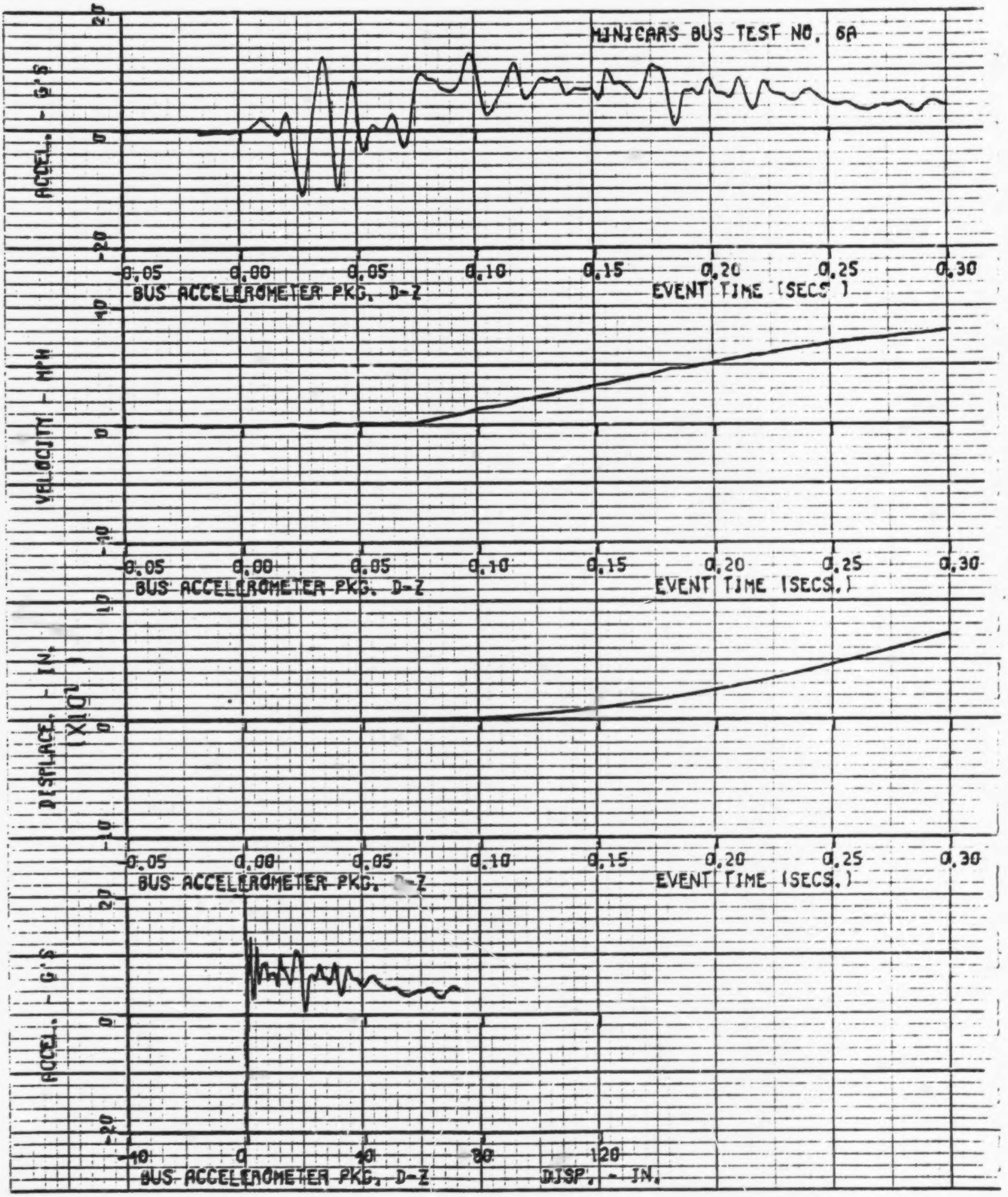

MINICARS BUS TEST NO. 6A
ACCEL - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-X
EVENT TIME (SECS.)
VELOCITY - MPH
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-X
EVENT TIME (SECS.)
DISPLACE. - IN.
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-X
EVENT TIME (SECS.)
ACCEL - G'S
20
0
-20
0
4
8
12
16
BUS ACCELEROMETER PKG. C-X
DISP. - IN.

6440-V-4

362


MINICARS BUS TEST NO. 6A
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-Z
EVENT TIME (SECS.)
VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
1.0
0.5
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-Z
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
0
0.40
0.80
1.20
1.60
BUS ACCELEROMETER PKG. C-Z
DISP. - IN.

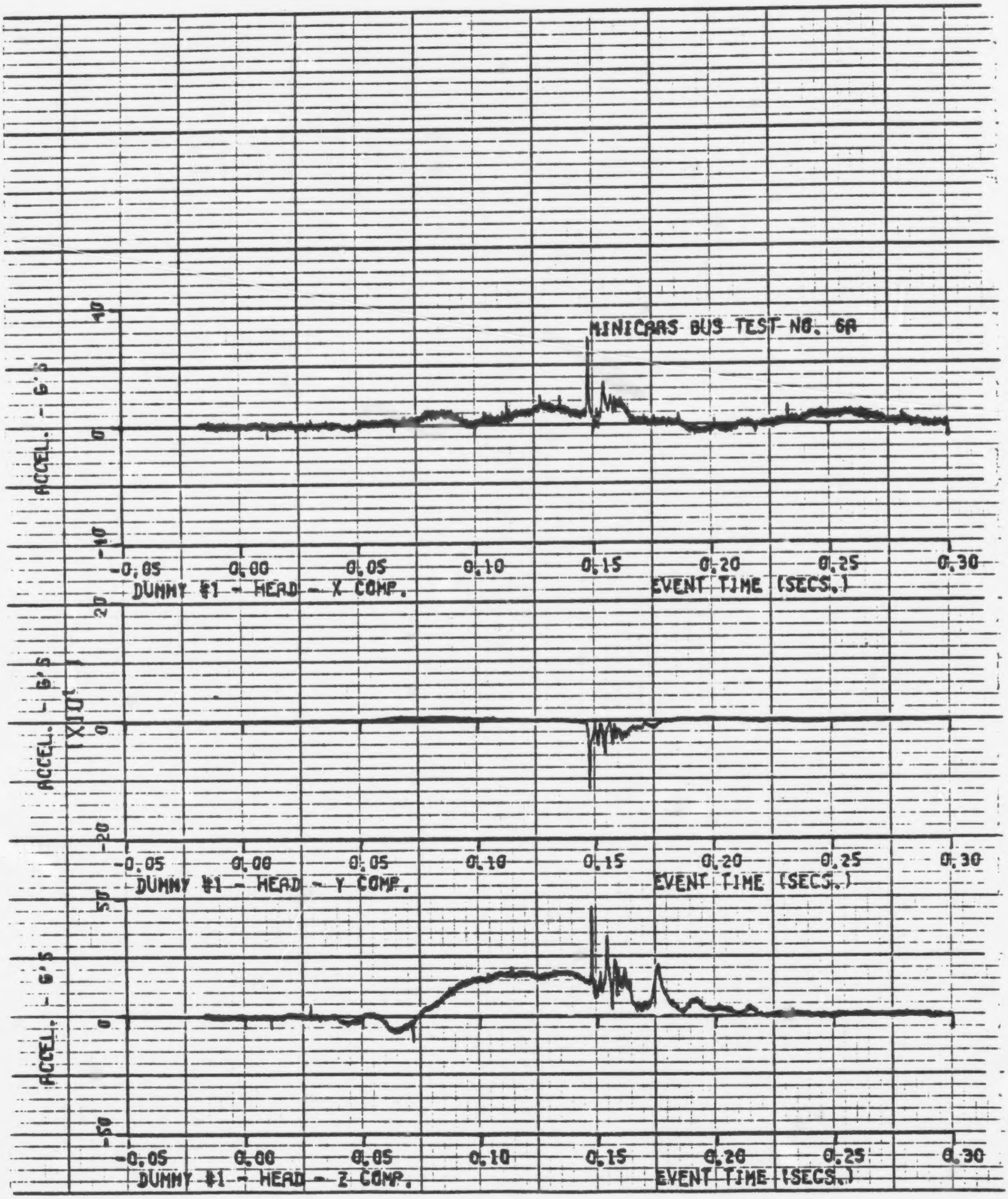

MINICARS BUS TEST NO. 6A
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. D-X
EVENT TIME (SECS.)
VELOCITY - MPH
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. D-X
EVENT TIME (SECS.)
DISPLACE. - IN.
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. D-X
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
0
5
10
15
20
BUS ACCELEROMETER PKG. D-X
DISP. - IN.

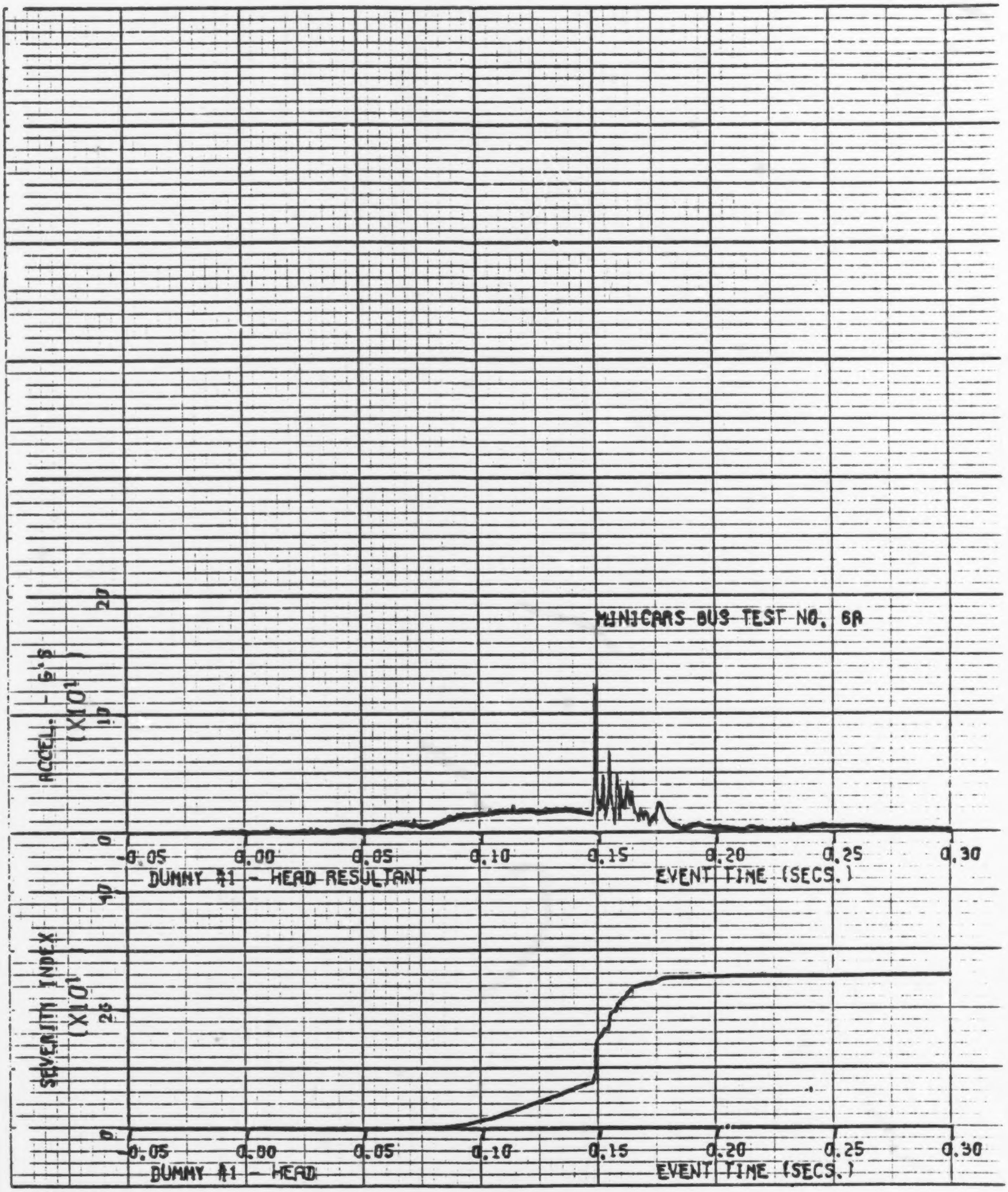

MINICARS BUS TEST NO. 6A
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. D-Z
EVENT TIME (SECS.)
VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. D-Z
EVENT TIME (SECS.)
DISPLACE. - IN. (X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. D-Z
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-40
0
40
80
120
BUS ACCELEROMETER PKG. D-Z
DISP. - IN.

BLANK PAGE

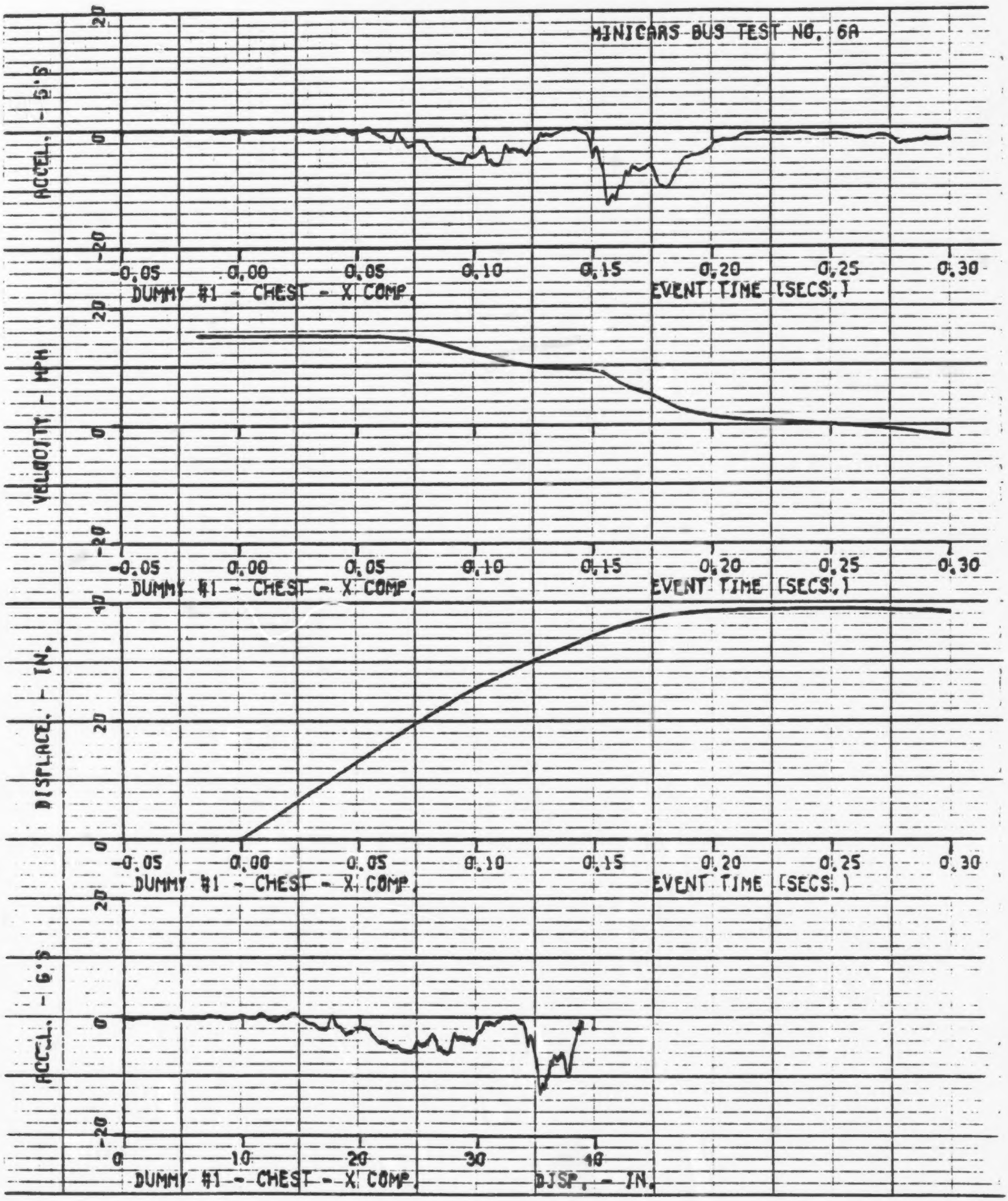
366

DUMMY DATA


MINICARS BUS TEST NO. 6A
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - HEAD - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
(X10^1)
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - HEAD - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
50
0
-50
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - HEAD - Z COMP.
EVENT TIME (SECS.)

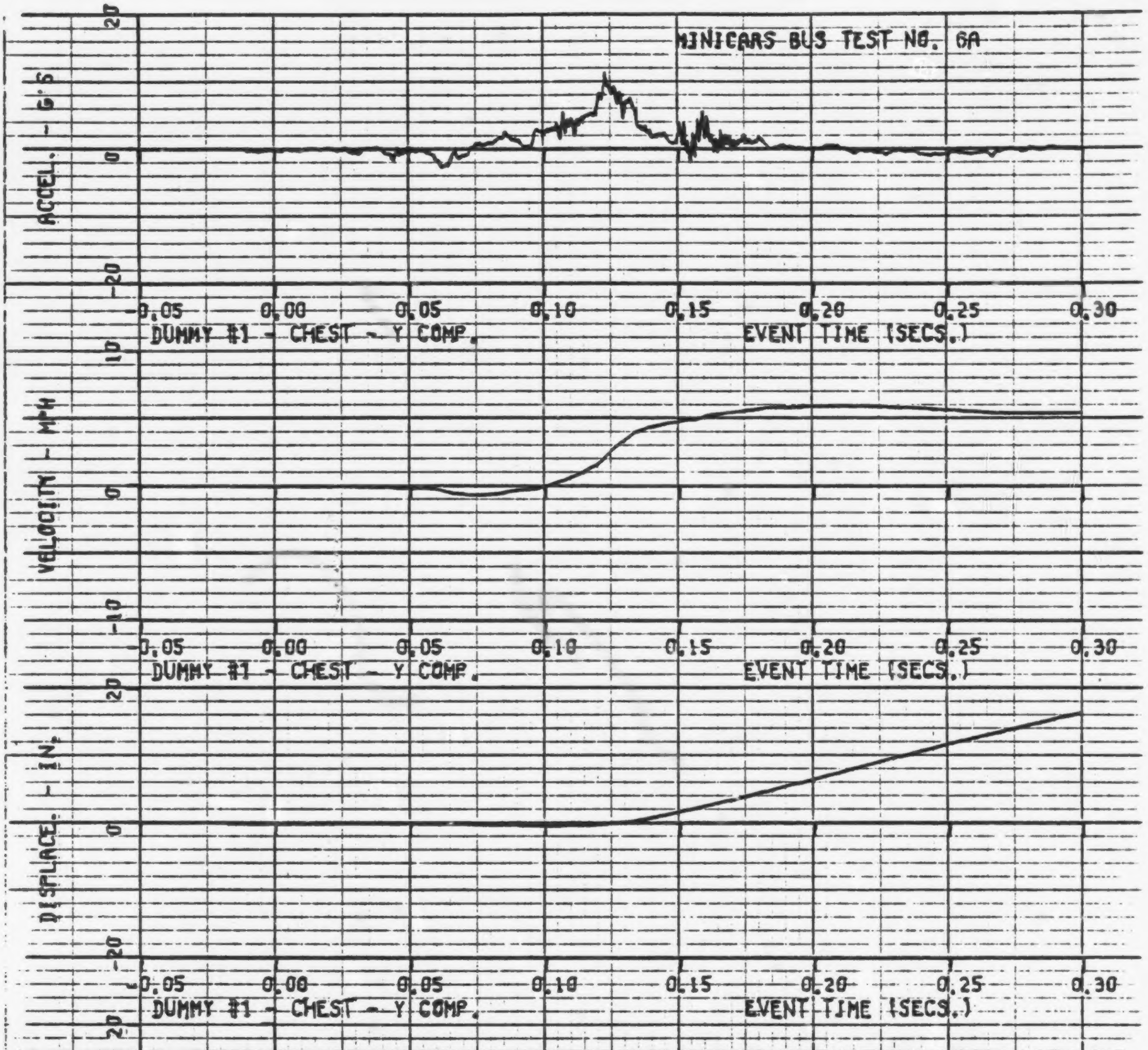

MINICARS BUS TEST NO. 6A
ACCEL. - G'S
(X10¹)
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
(X10¹)
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - HEAD
EVENT TIME (SECS.)

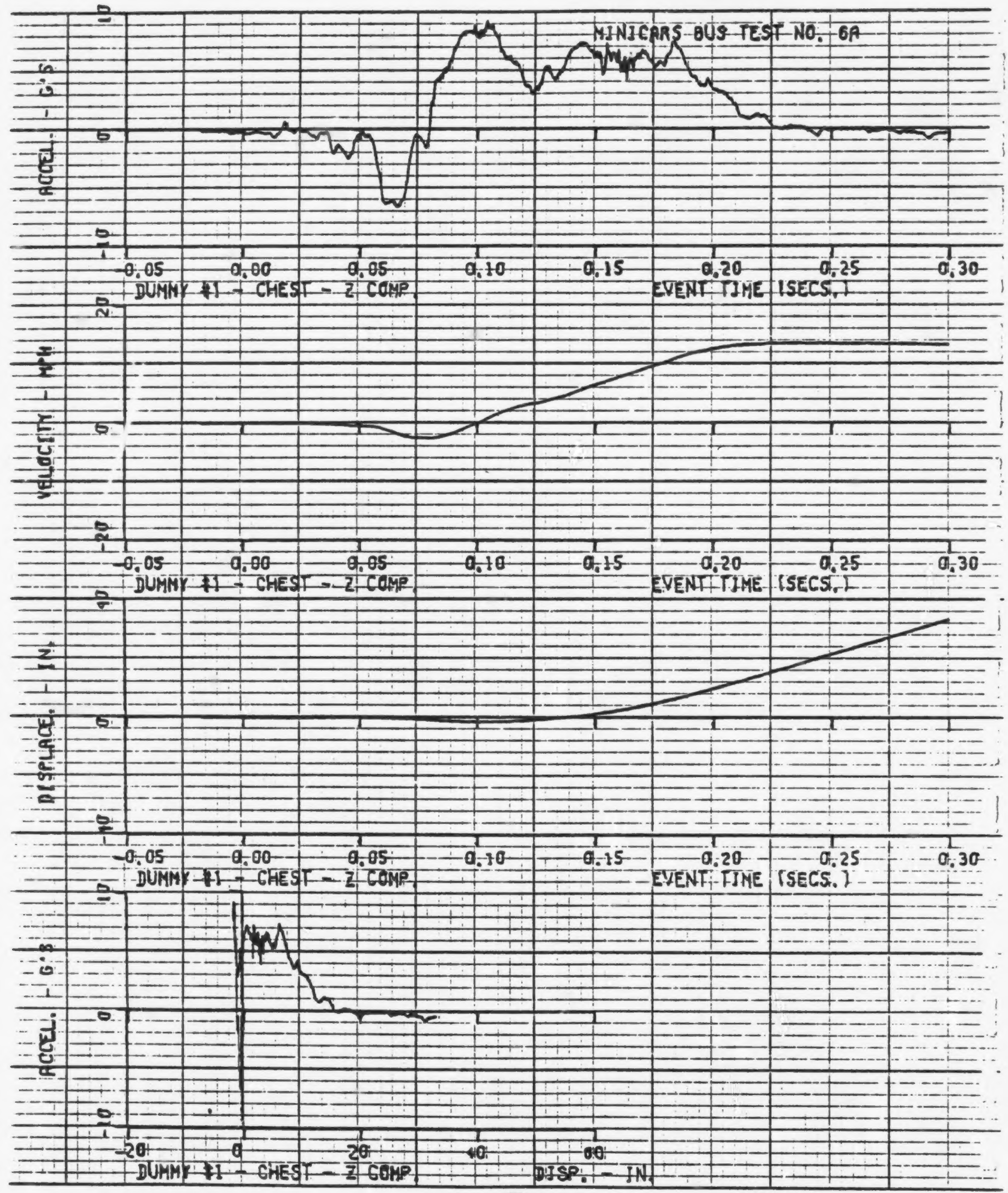
6440-V-4


MINICARS BUS TEST NO. 6A
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST - X COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST - X COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
0
10
20
30
40
DUMMY #1 - CHEST - X COMP.
DISP. - IN.

370

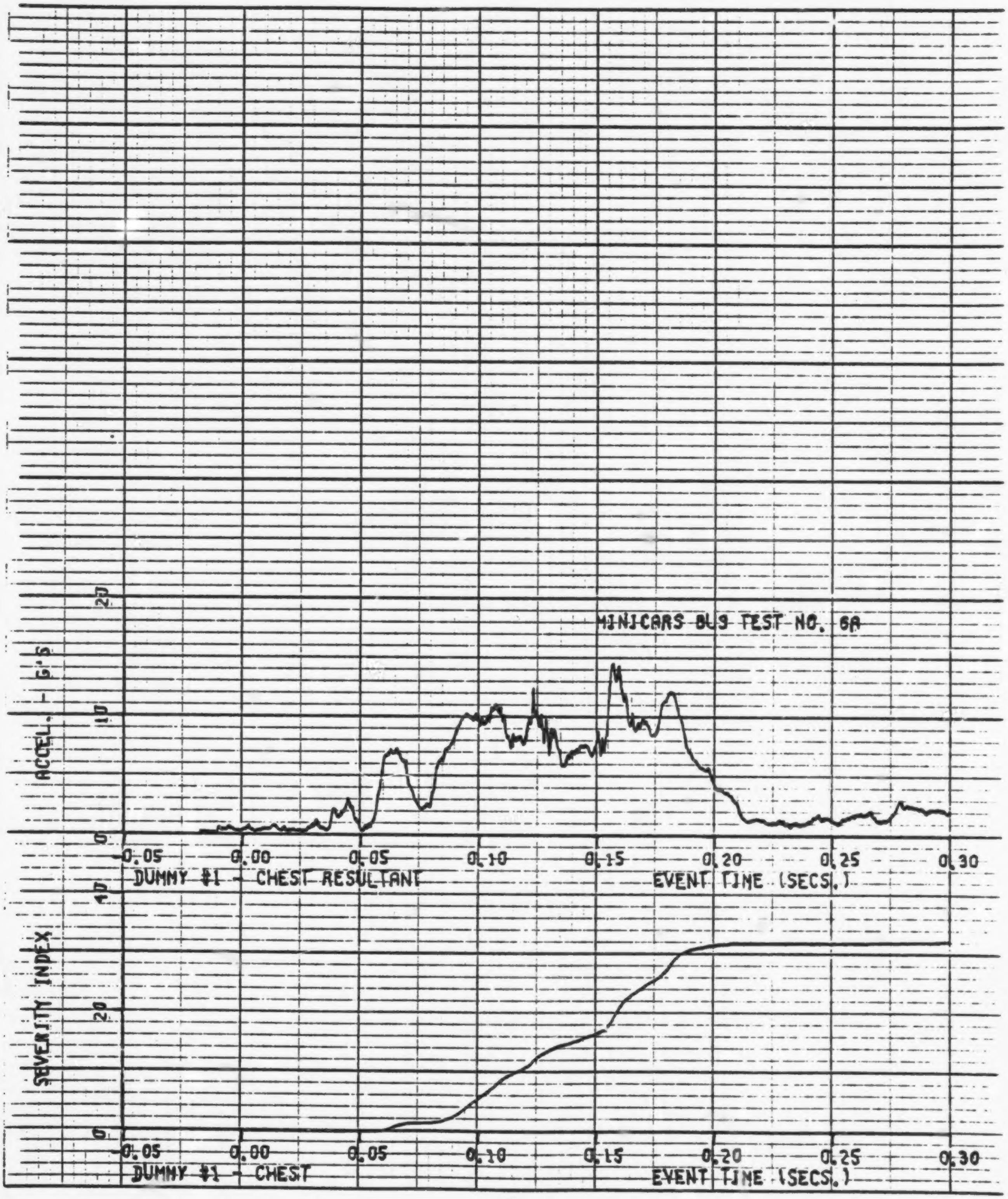
6440-V-4


MINICARS BUS TEST NO. 6A
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST - Y COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST - Y COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-10
0
10
20
30
DUMMY #1 - CHEST - Y COMP.
DISP. - IN.


MINICARS BUS TEST NO. 6A
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST - Z COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST - Z COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST - Z COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-20
0
20
40
60
DUMMY #1 - CHEST - Z COMP.
DISP. - IN.

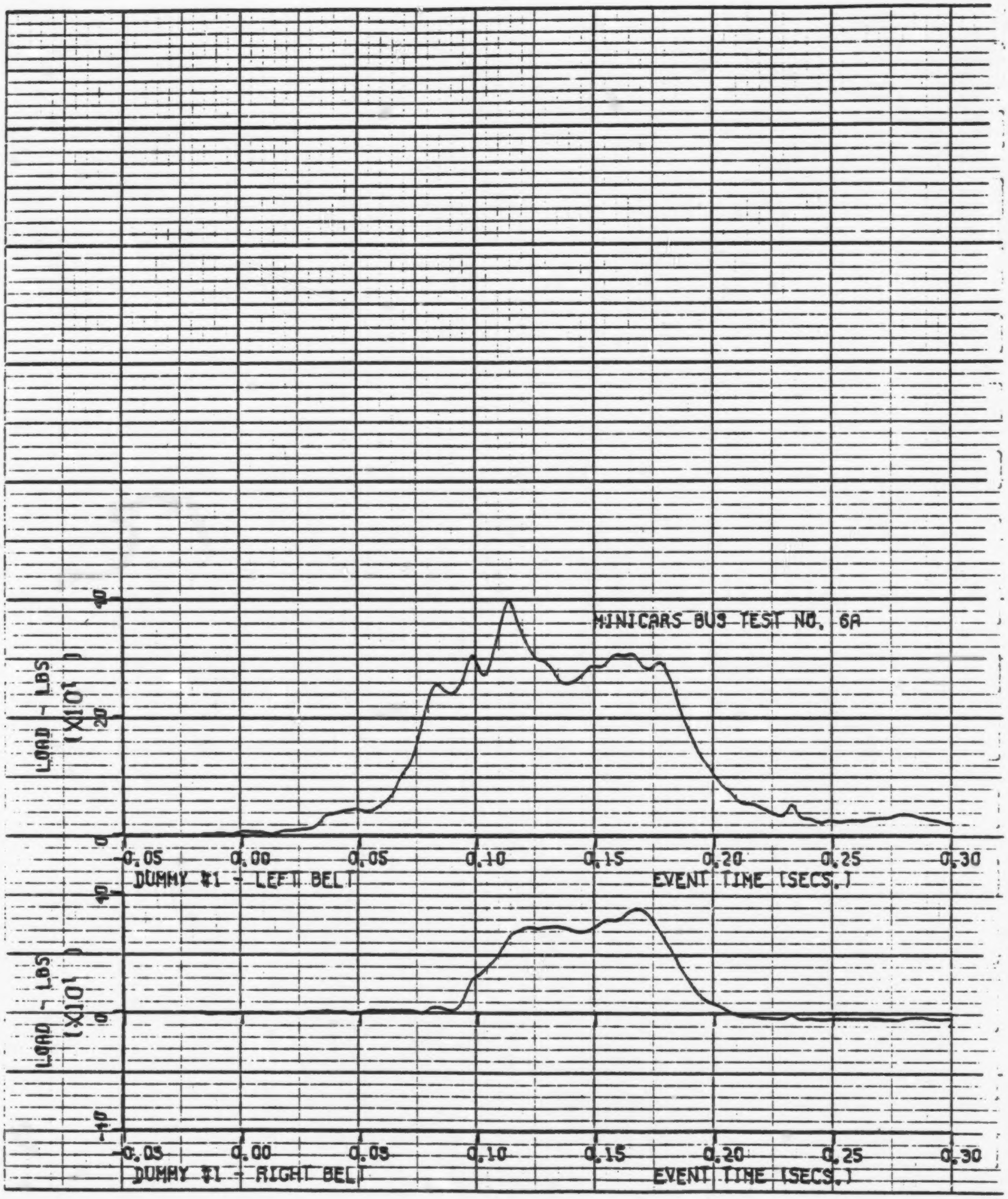
6440-V-4

372

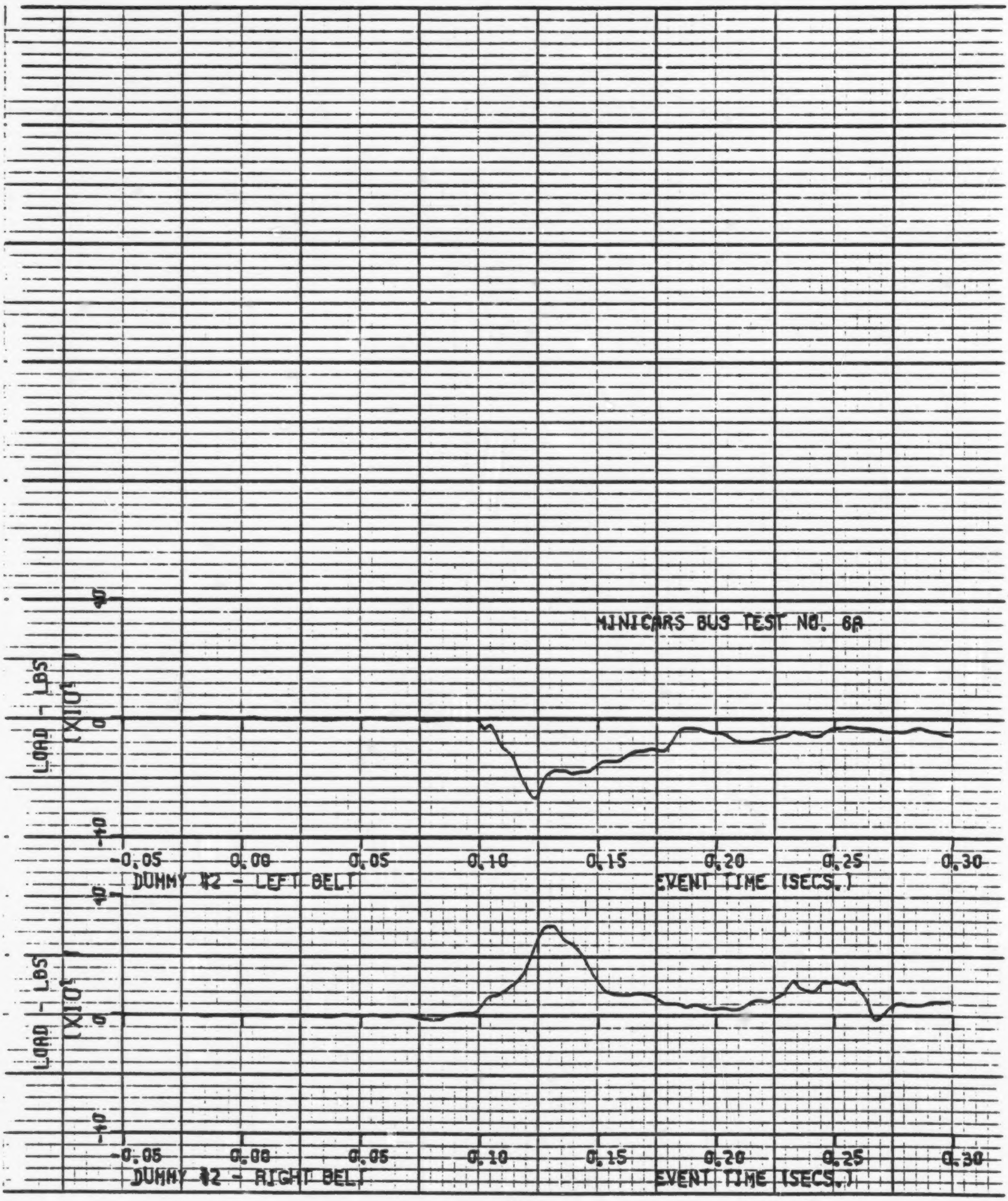

MINICARS BUS TEST NO. 6A
ACCEL. - G'S
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST
EVENT TIME (SECS.)

6440-V-4

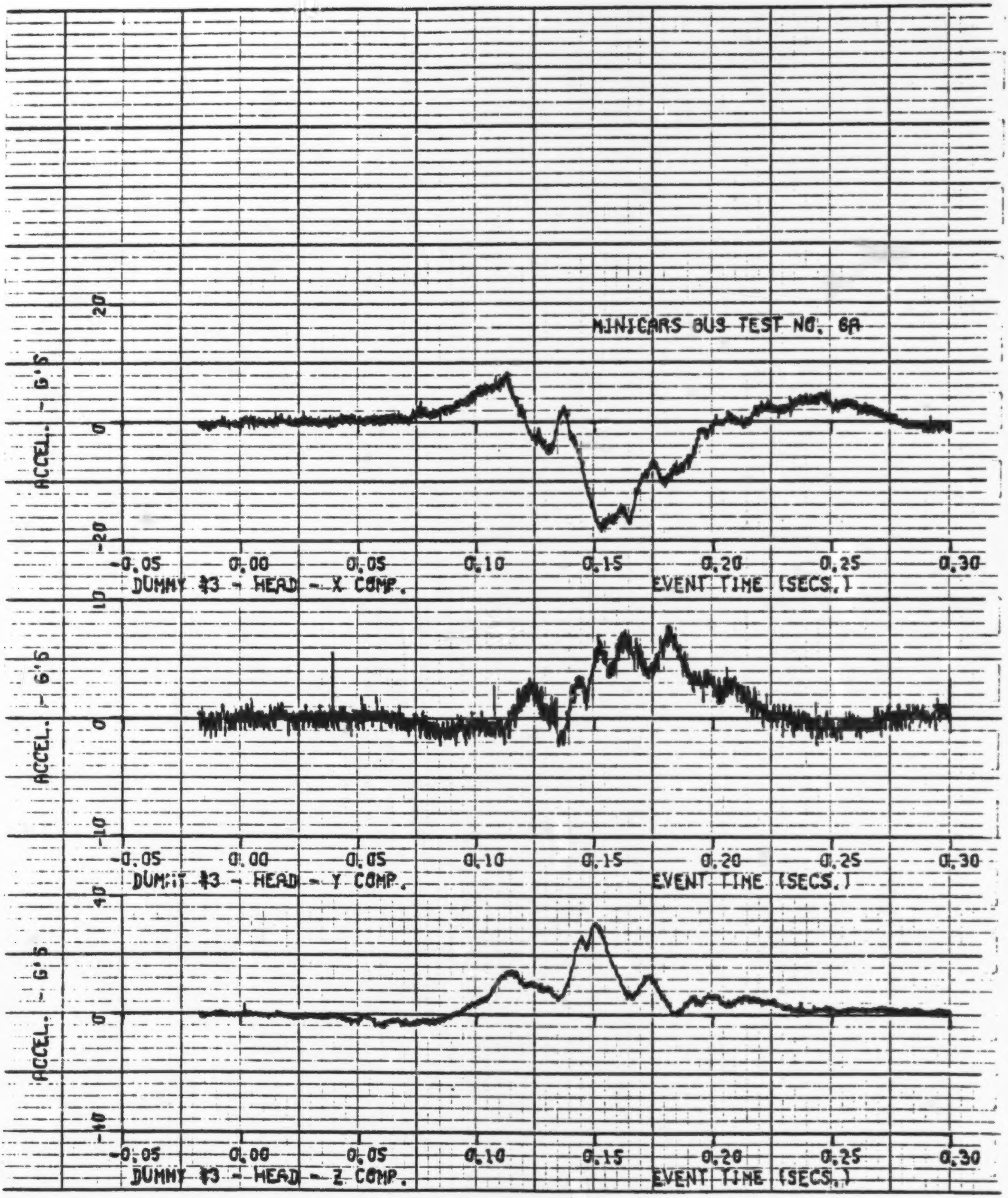
373


MINICARS BUS TEST NO. 6A
LOAD - LBS
(X10¹)
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - LEFT BELT
EVENT TIME (SECS.)
LOAD - LBS
(X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - RIGHT BELT
EVENT TIME (SECS.)

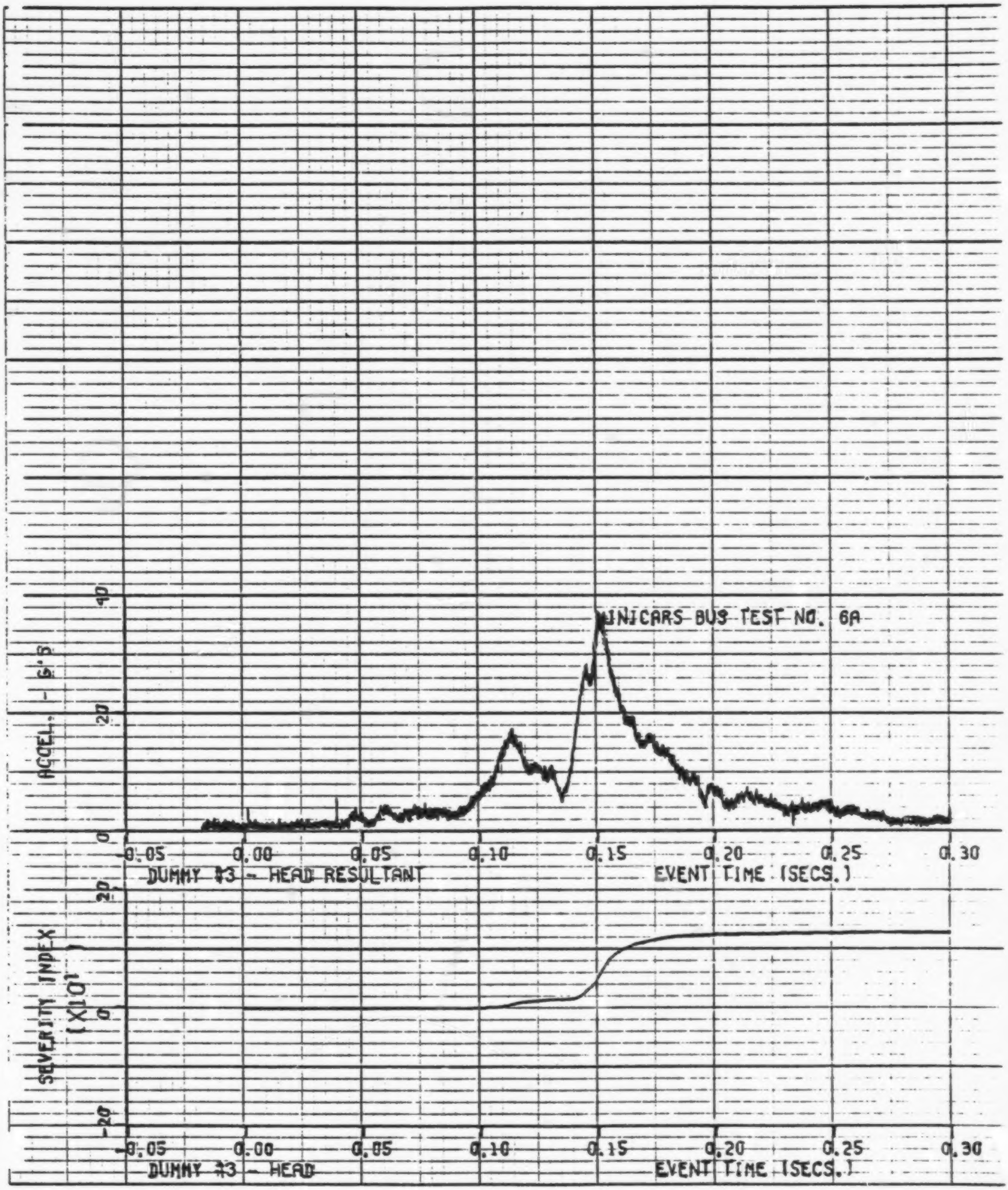
6440-V-4


MINICARS BUS TEST NO. 6A
LOAD - LBS (X10¹)
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - LEFT BELT
EVENT TIME (SECS.)
LOAD - LBS (X10¹)
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - RIGHT BELT
EVENT TIME (SECS.)

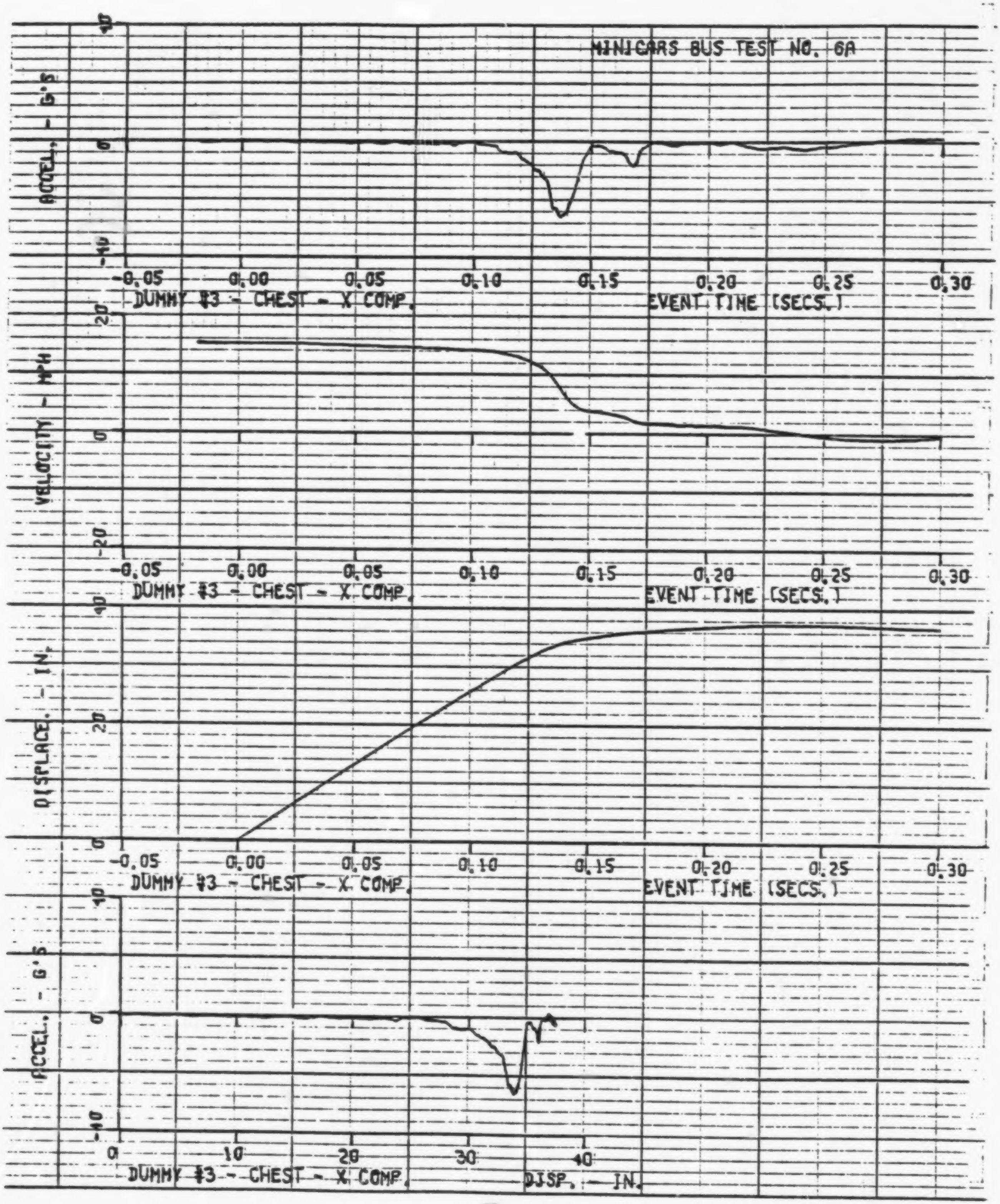
6440-V-4


MINICARS BUS TEST NO. 6A
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - HEAD - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - HEAD - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - HEAD - Z COMP.
EVENT TIME (SECS.)

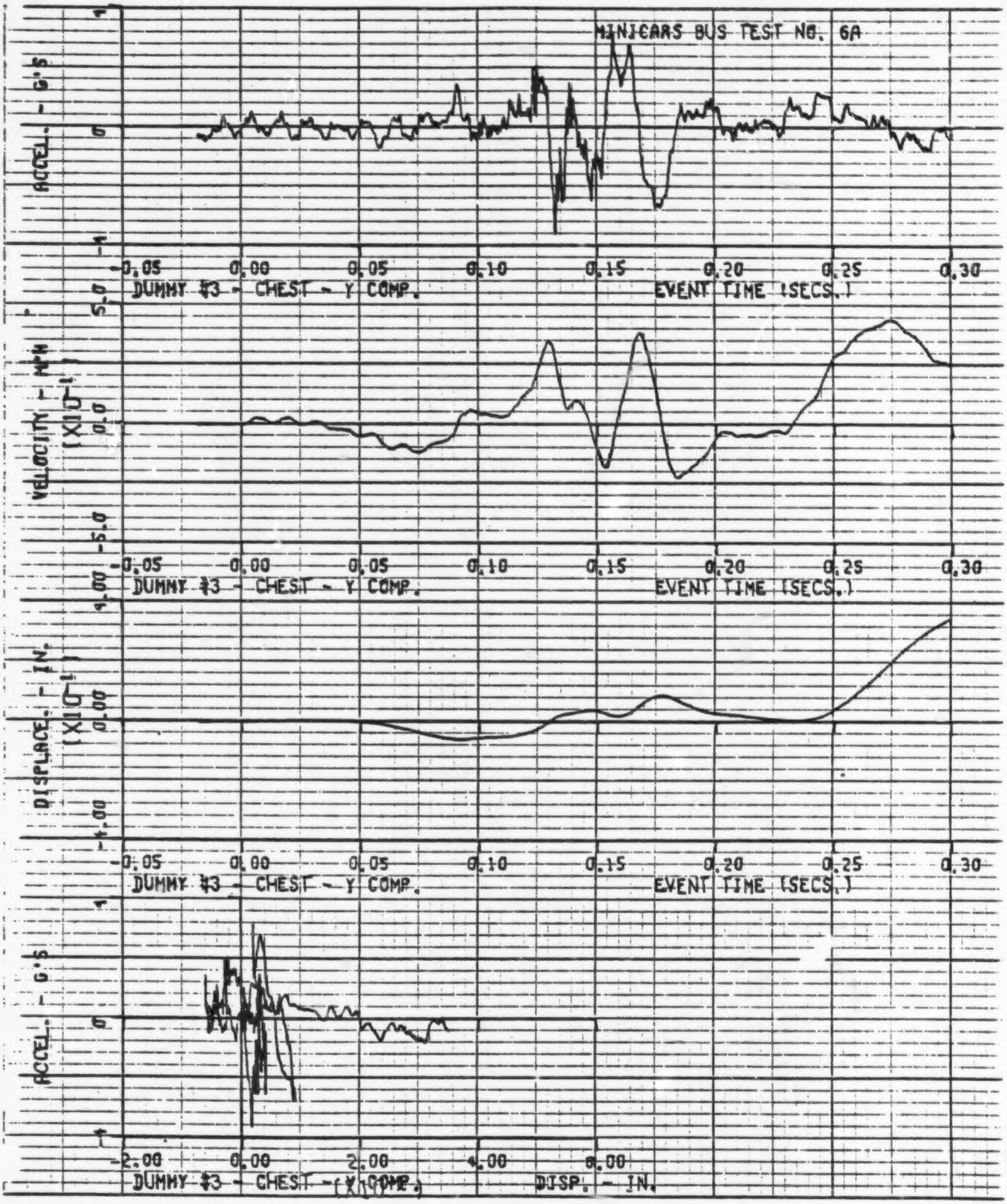
6440-V-4


UNICARS BUS TEST NO. 6A
ACCEL. - G'S
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX (X10¹)
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - HEAD
EVENT TIME (SECS.)

6440-V-4

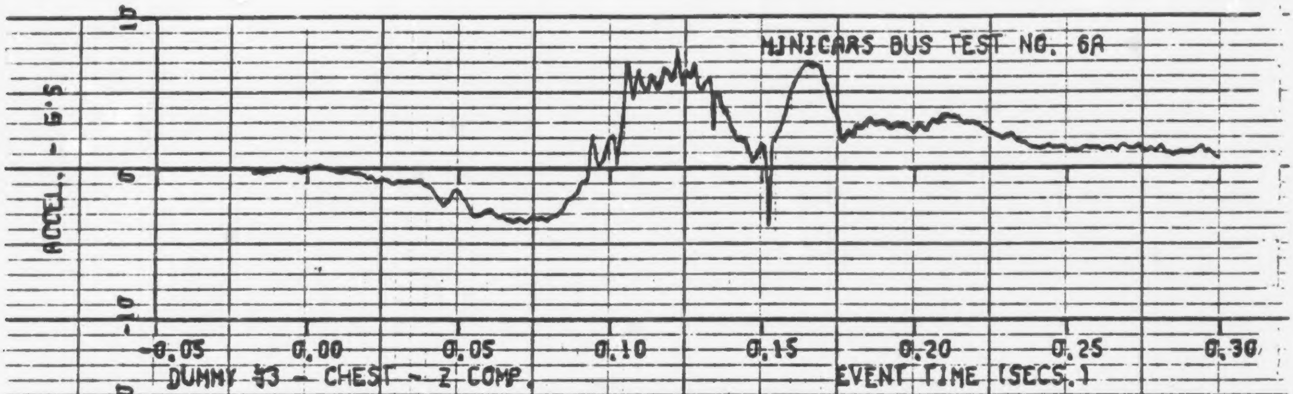

MINICARS BUS TEST NO. 6A
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - X COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - X COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
0
10
20
30
40
DUMMY #3 - CHEST - X COMP.
DISP. - IN.

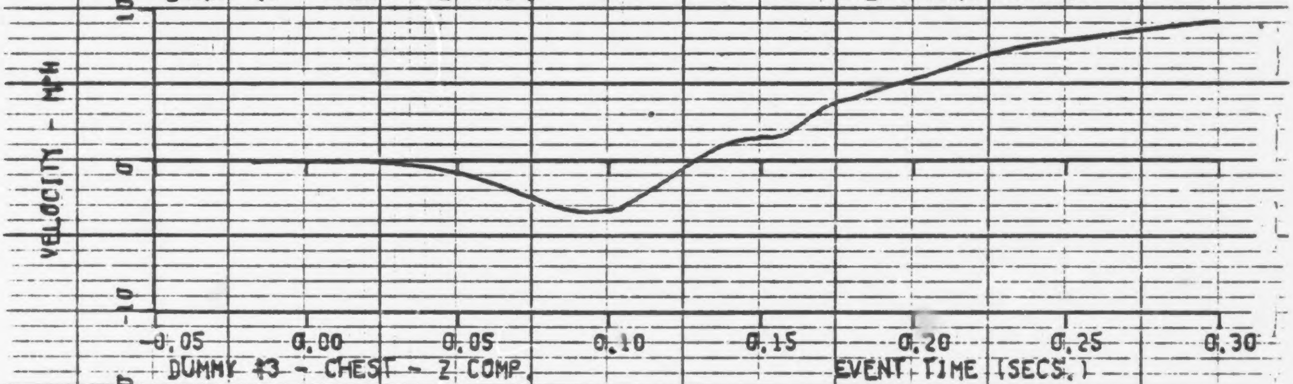
6440-V-4

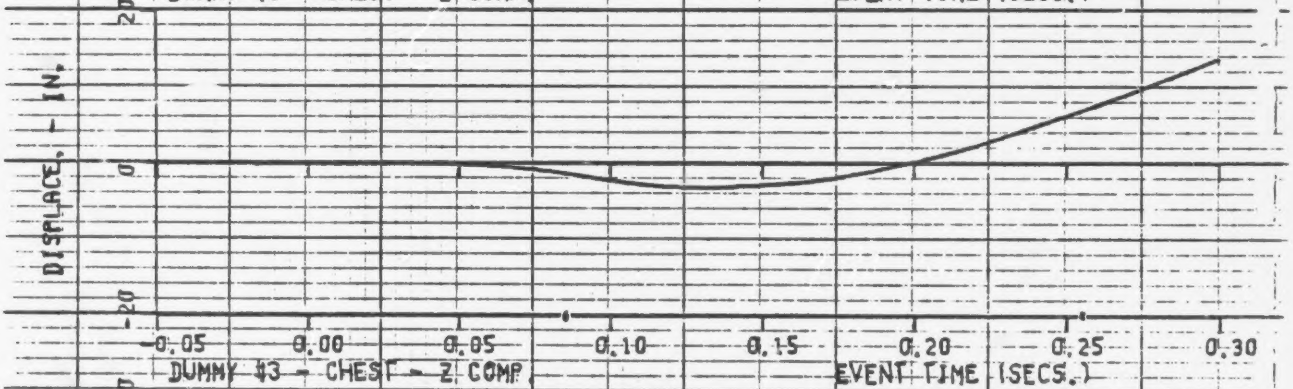

MINICARS BUS TEST NO. 6A
ACCEL. - G'S
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - Y COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
(X10⁻¹)
5.0
0.0
-5.0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - Y COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
(X10⁻¹)
4.00
0.00
-4.00
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
4
0
-4
-2.00
0.00
2.00
4.00
6.00
DUMMY #3 - CHEST - Y COMP.
(X10⁻¹)
DISP. - IN.

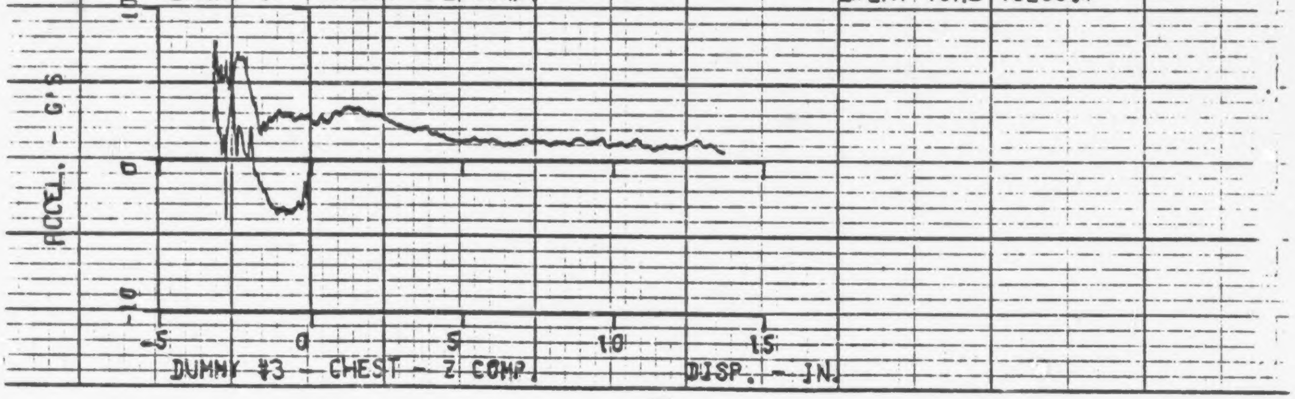
6440-V-4

379

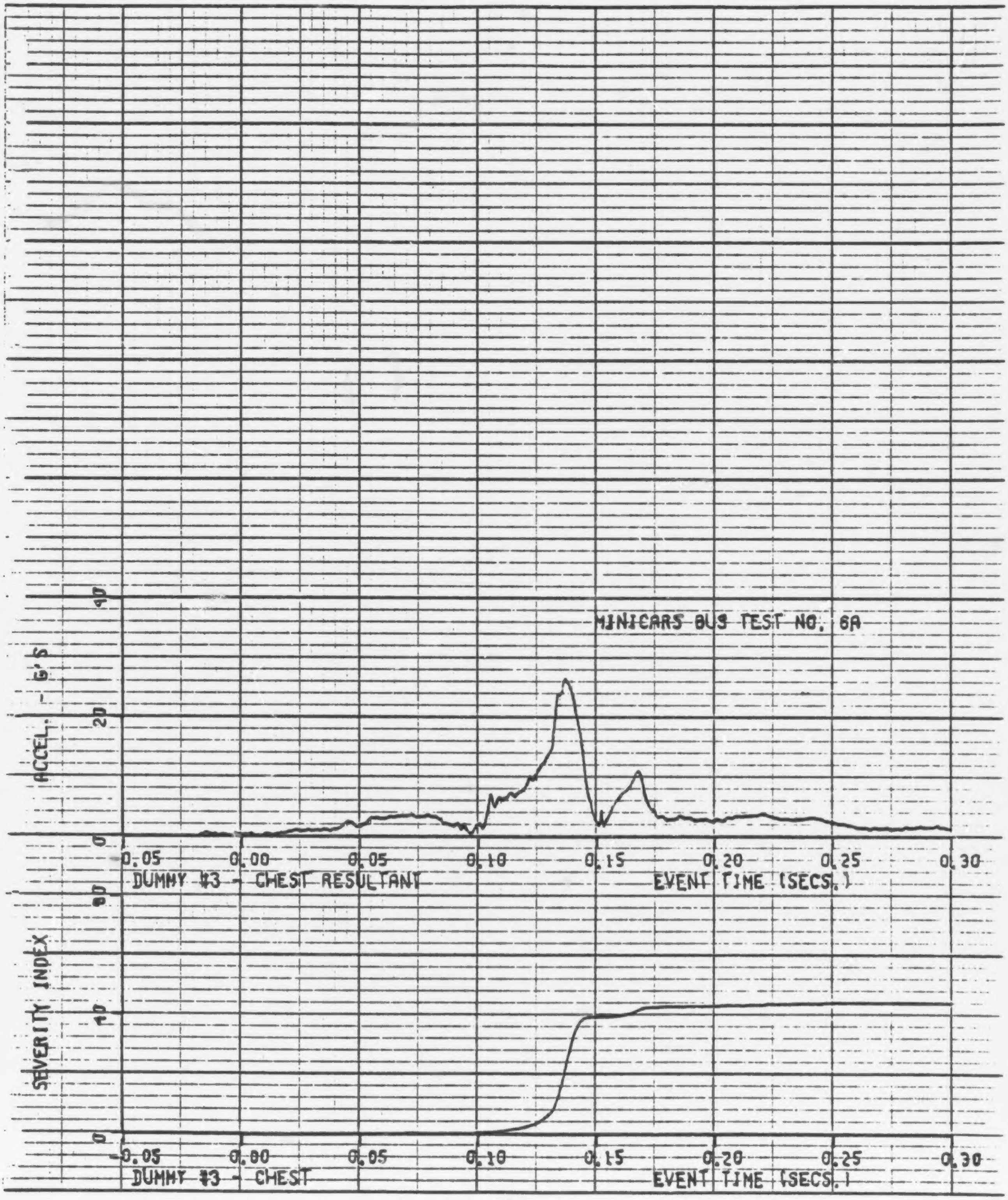

MINICARS BUS TEST NO. 6A
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - Z COMP.
EVENT TIME (SECS.)


VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - Z COMP.
EVENT TIME (SECS.)

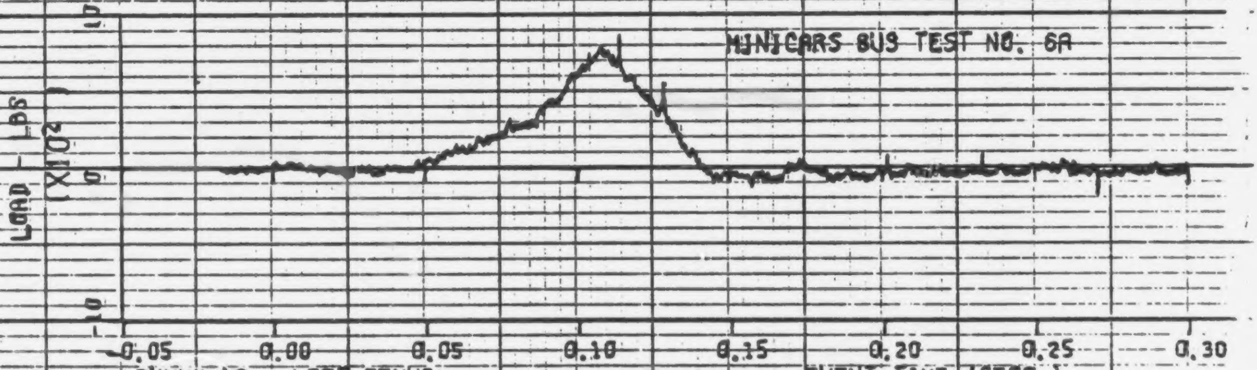

DISPLACE. - IN.
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - Z COMP.
EVENT TIME (SECS.)


ACCEL. - G'S
10
0
-10
-5
0
5
10
15
DUMMY #3 - CHEST - Z COMP.
DISP. - IN.

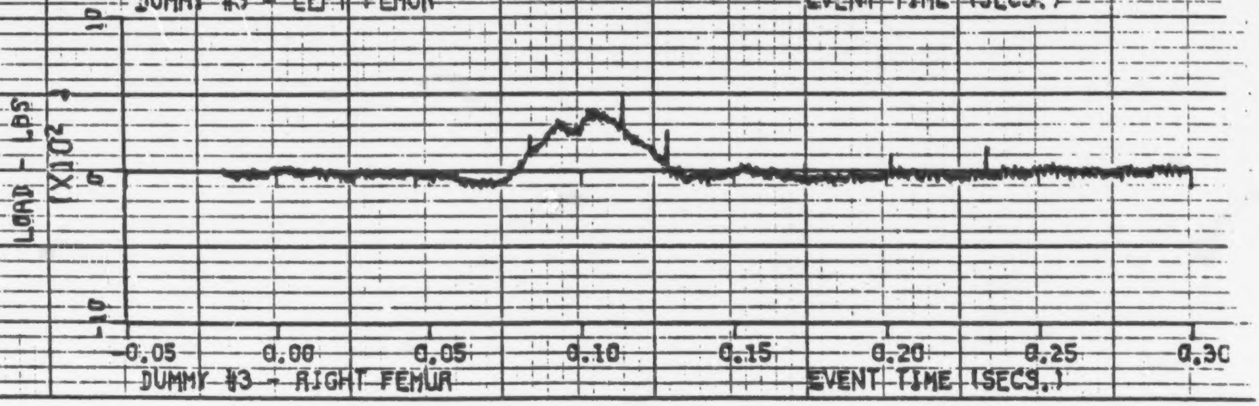
6440-V-4


MINICARS BUS TEST NO. 6A
ACCEL. - G'S
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST
EVENT TIME (SECS.)

6440-V-4

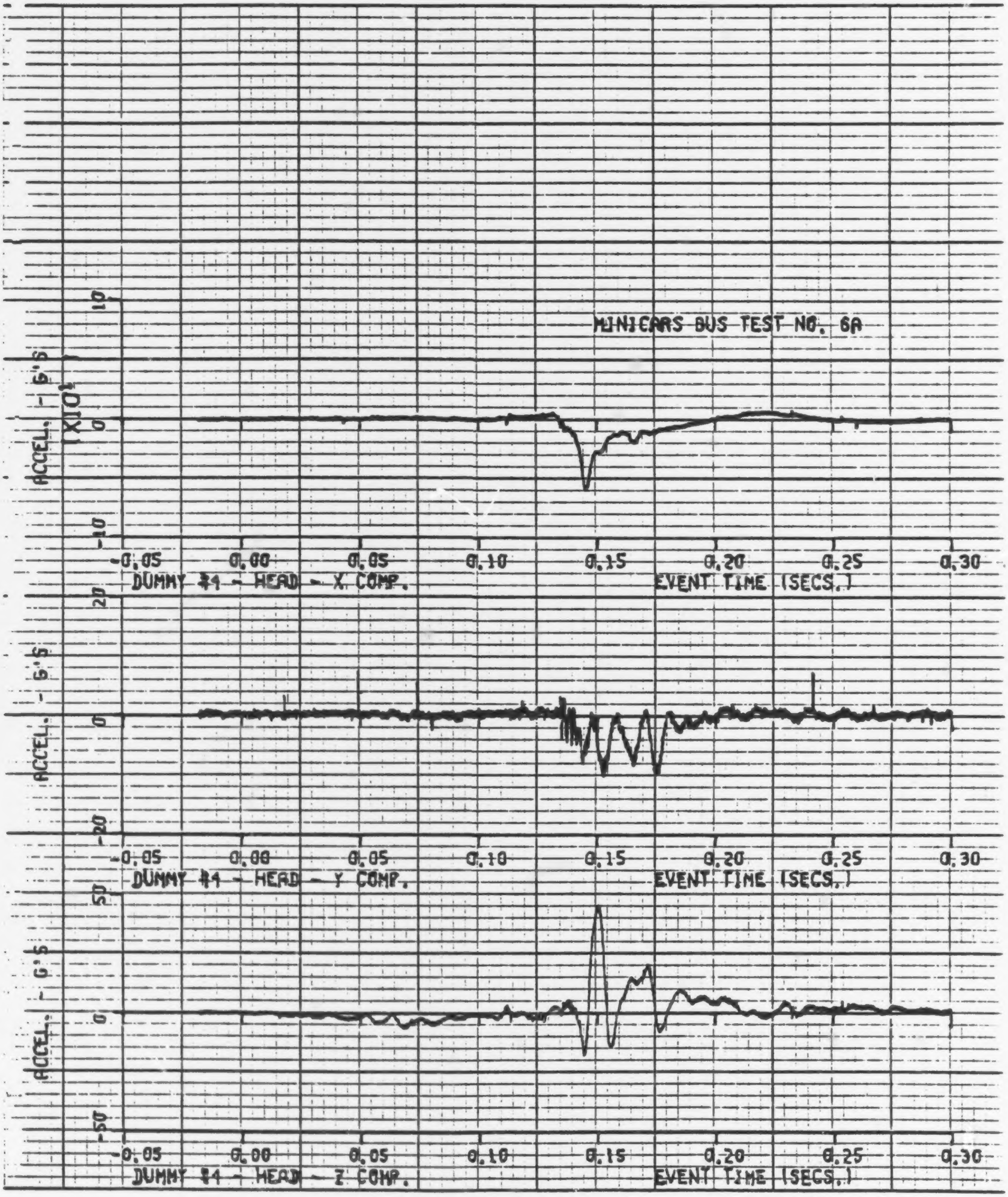


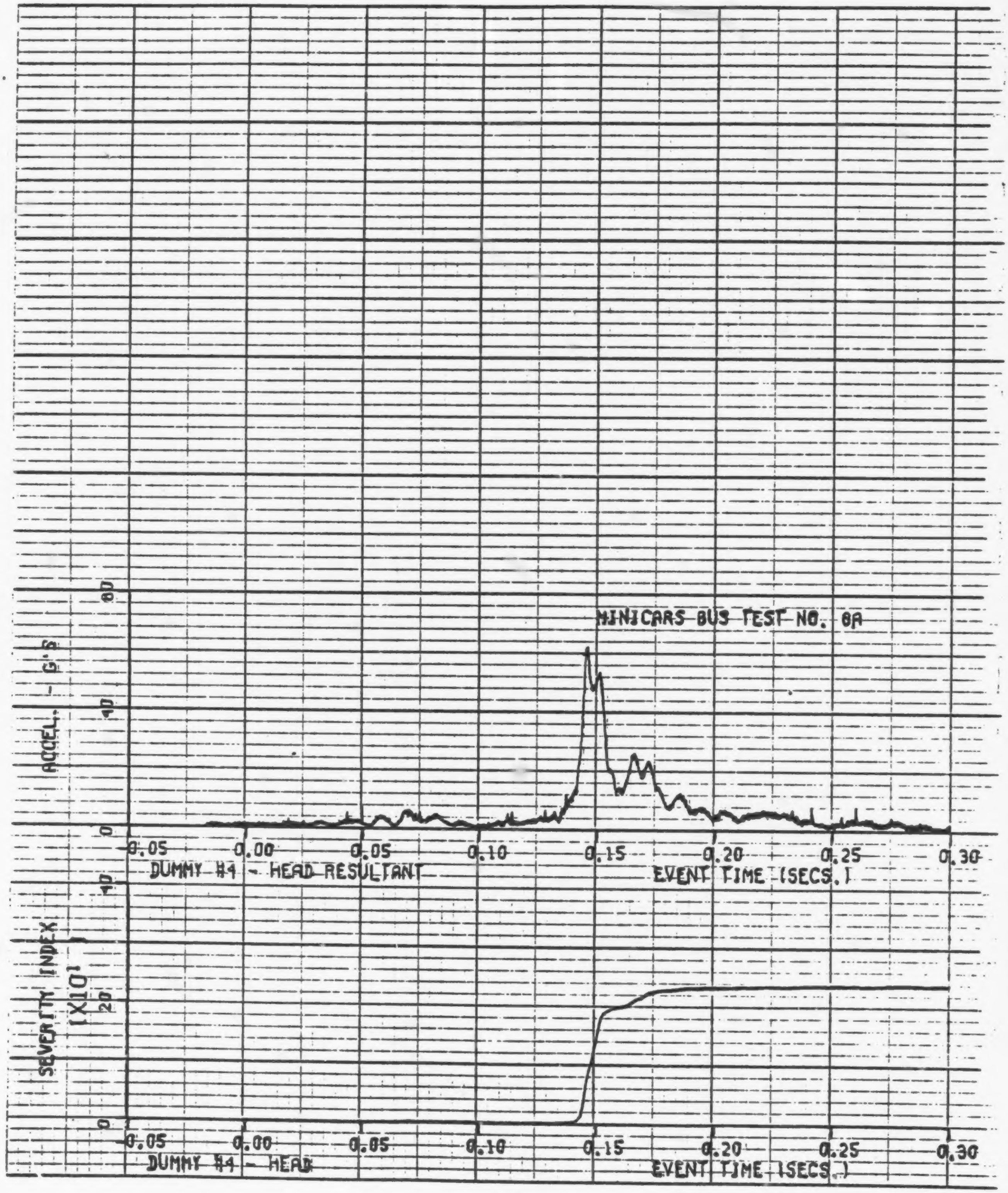
DUMMY #3 - LEFT FEMUR



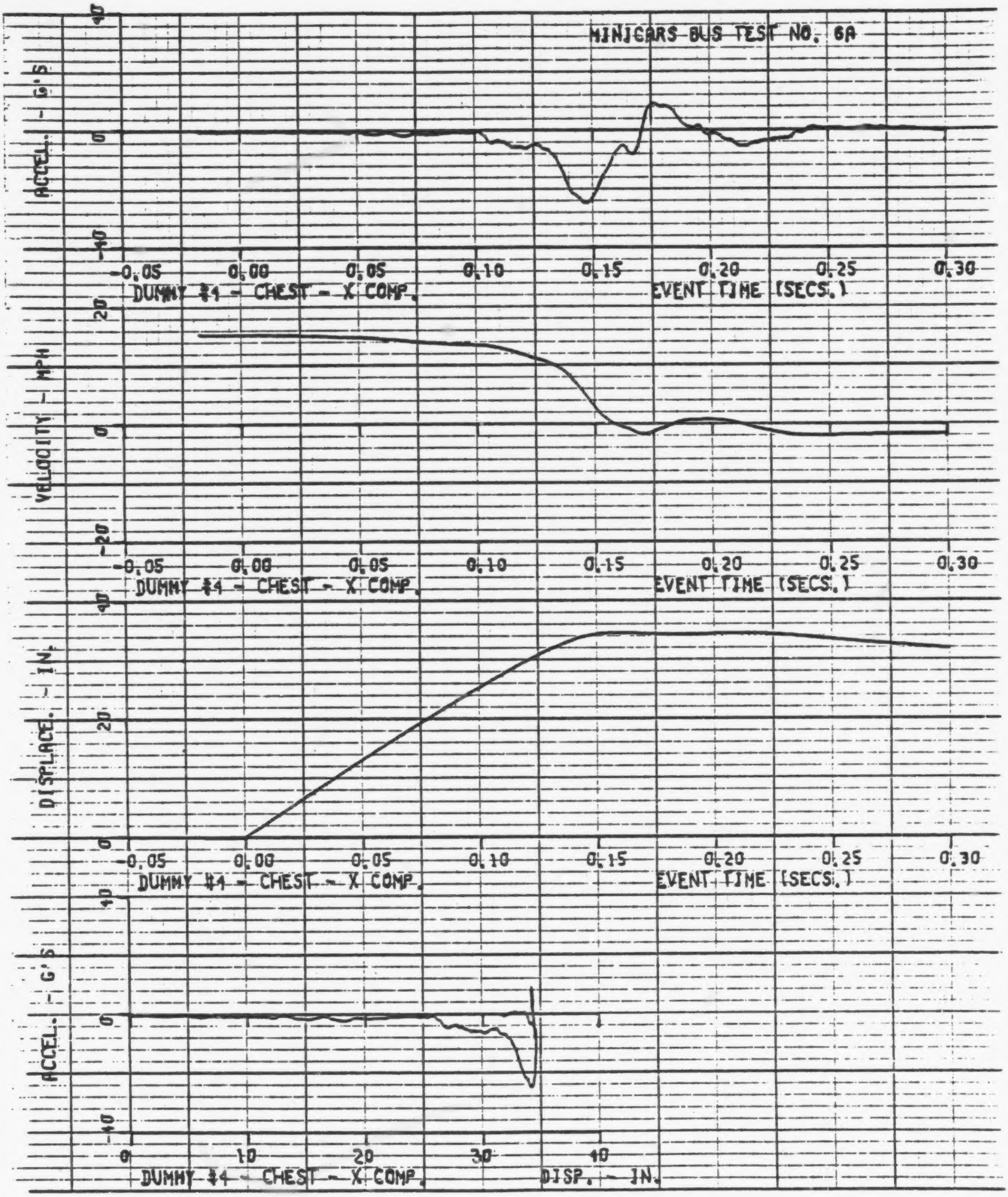
DUMMY #3 - RIGHT FEMUR

6440-V-4

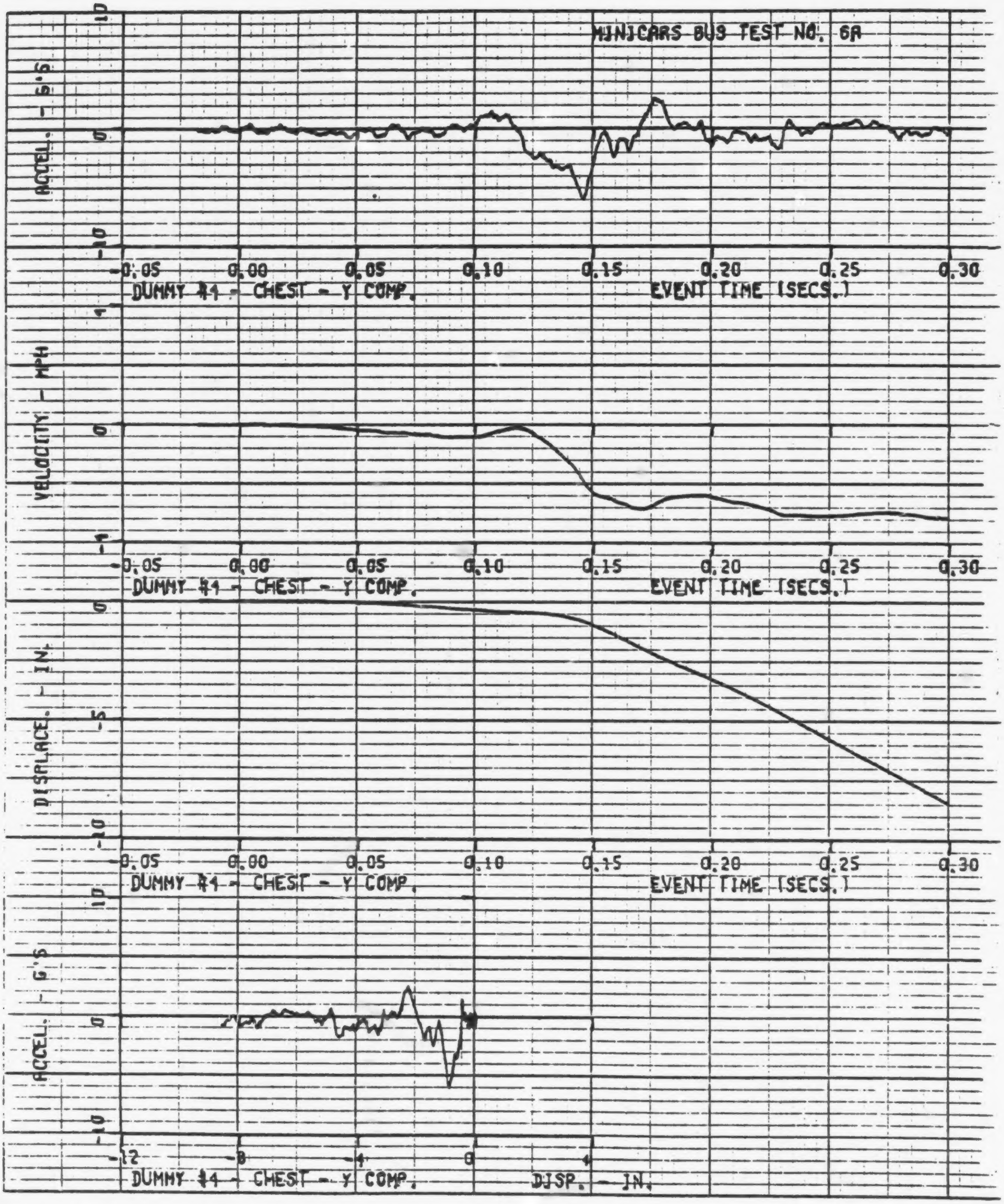

MINICARS BUS TEST NO. 6A
ACCEL. - G'S (X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - HEAD - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - HEAD - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
50
0
-50
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - HEAD - Z COMP.
EVENT TIME (SECS.)


MINICARS BUS TEST NO. 8A
ACCEL. - G'S
80
40
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX (X10¹)
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - HEAD
EVENT TIME (SECS.)

6440-V-4

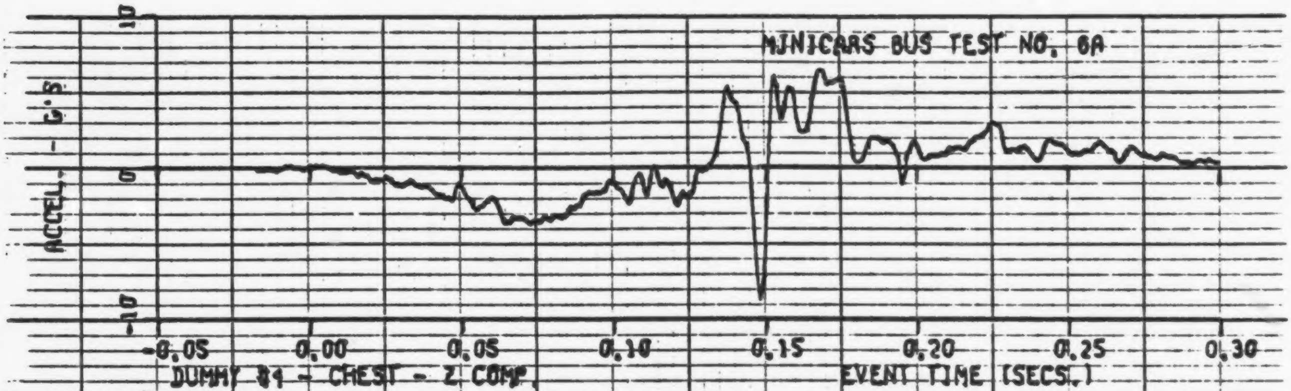

MINICARS BUS TEST NO. 6A
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - X COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - X COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
0
10
20
30
40
DUMMY #4 - CHEST - X COMP.
DISP. - IN.

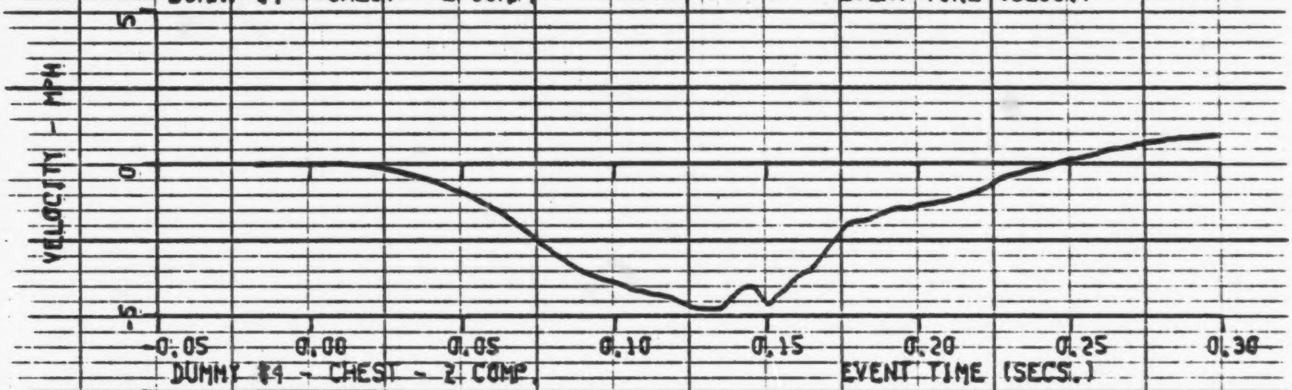
6440-V-4

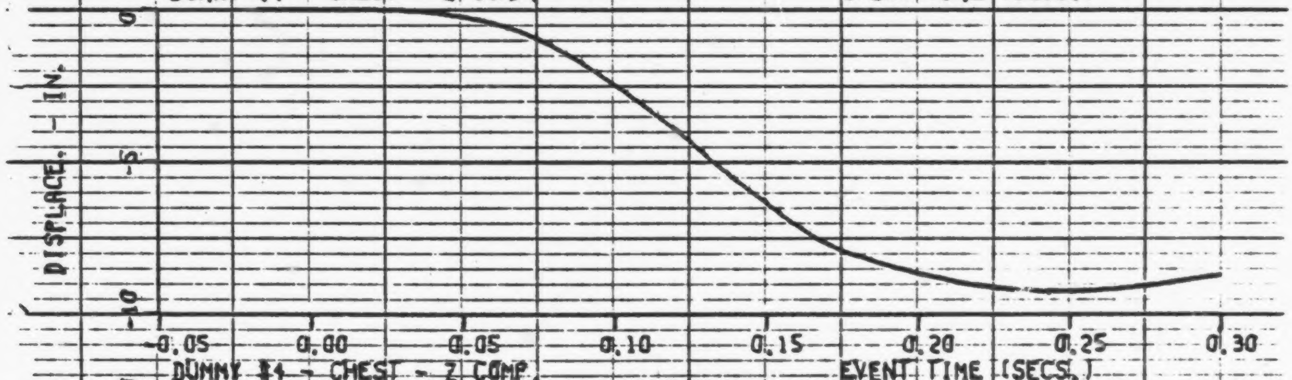

MINICARS BUS TEST NO. 6A
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Y COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Y COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-5
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-12
-8
-4
0
4
DUMMY #4 - CHEST - Y COMP.
DISP. - IN.

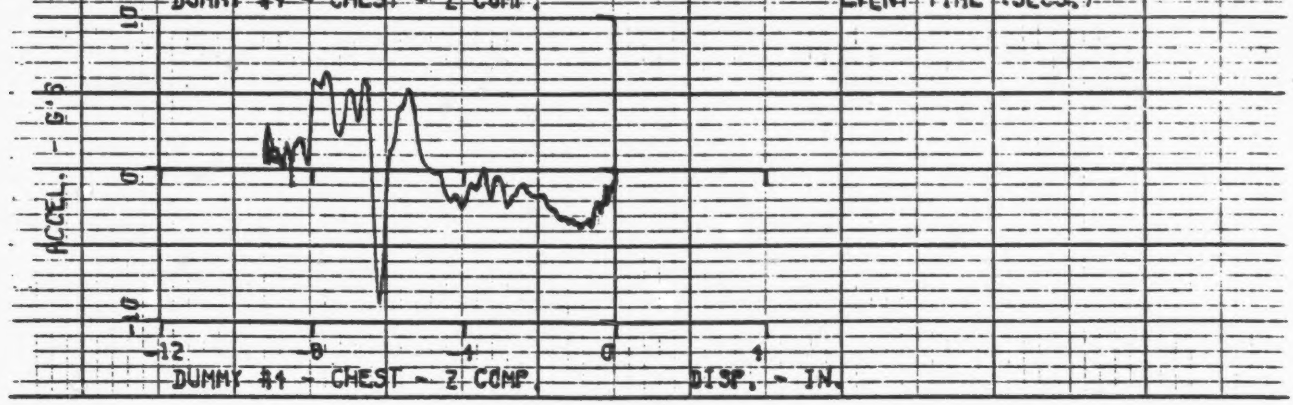
386

6440-V-4

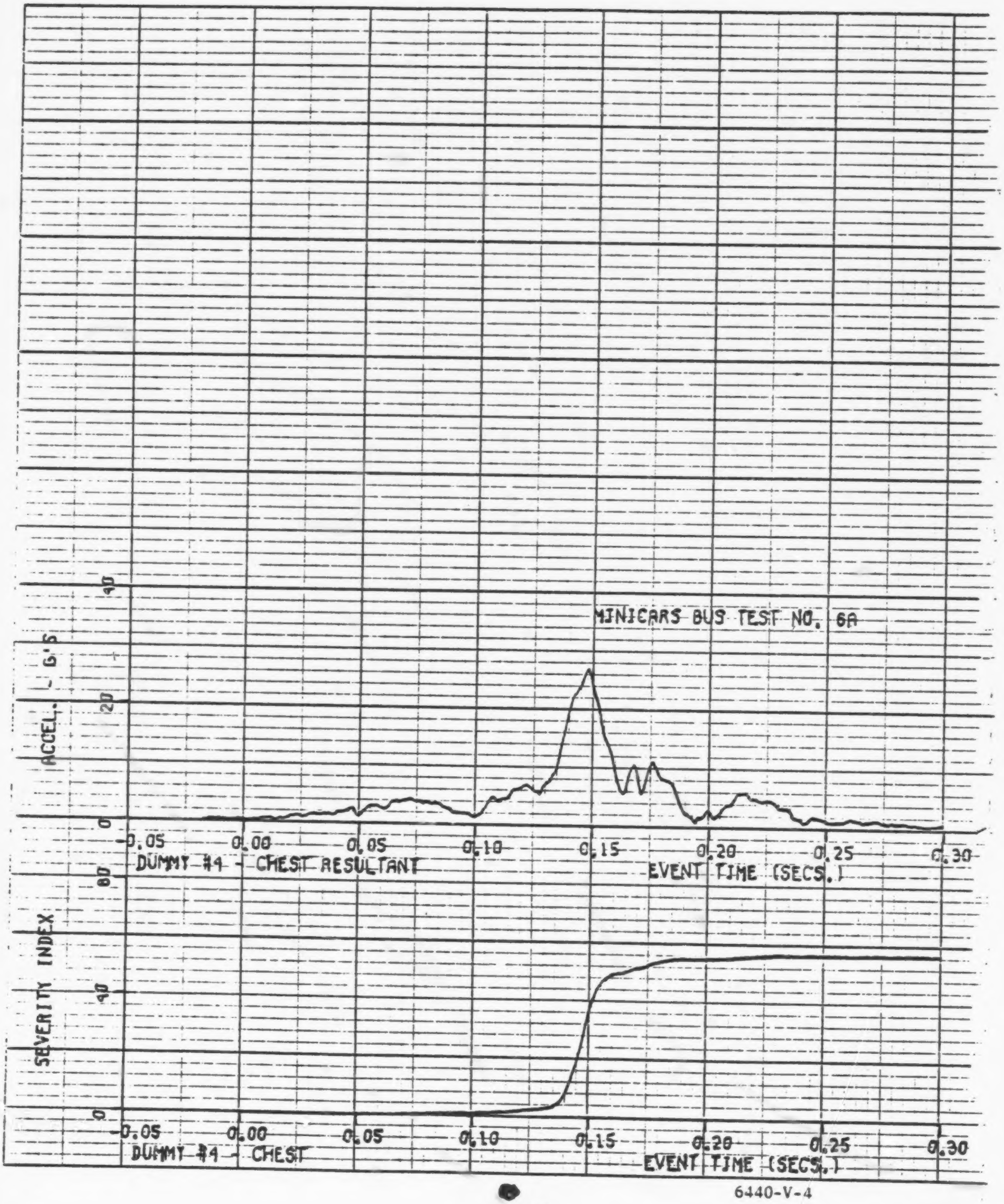

MINICARS BUS TEST NO. 6A
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Z COMP.
EVENT TIME (SECS.)


VELOCITY - MPH
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Z COMP.
EVENT TIME (SECS.)

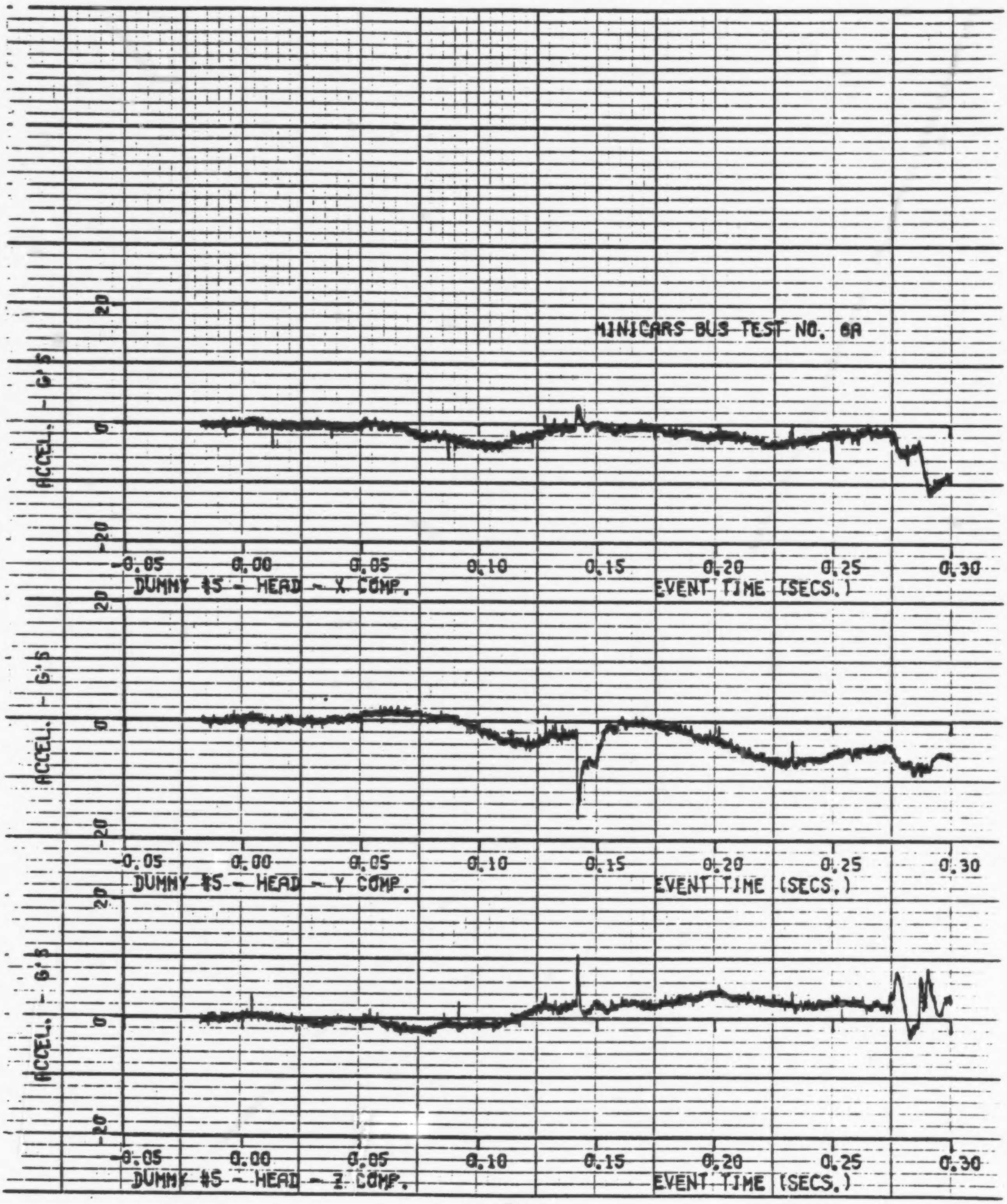

DISPLACE. - IN.
0
-5
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Z COMP.
EVENT TIME (SECS.)


ACCEL. - G'S
10
0
-10
-12
-8
-4
0
4
DUMMY #4 - CHEST - Z COMP.
DISP. - IN.

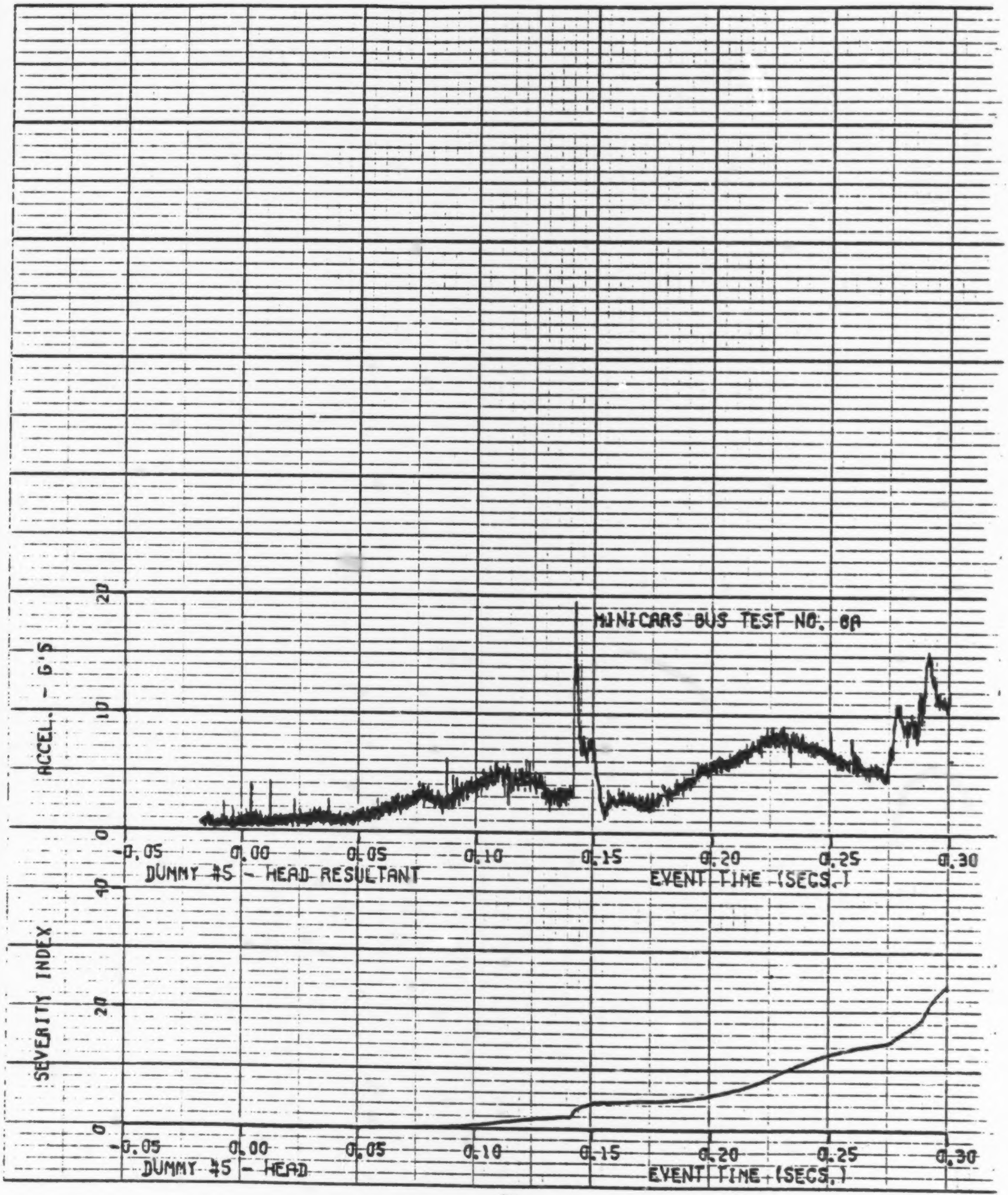
6440-V-4


MINICARS BUS TEST NO. 6A
ACCEL. _ G'S
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
80
40
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST
EVENT TIME (SECS.)

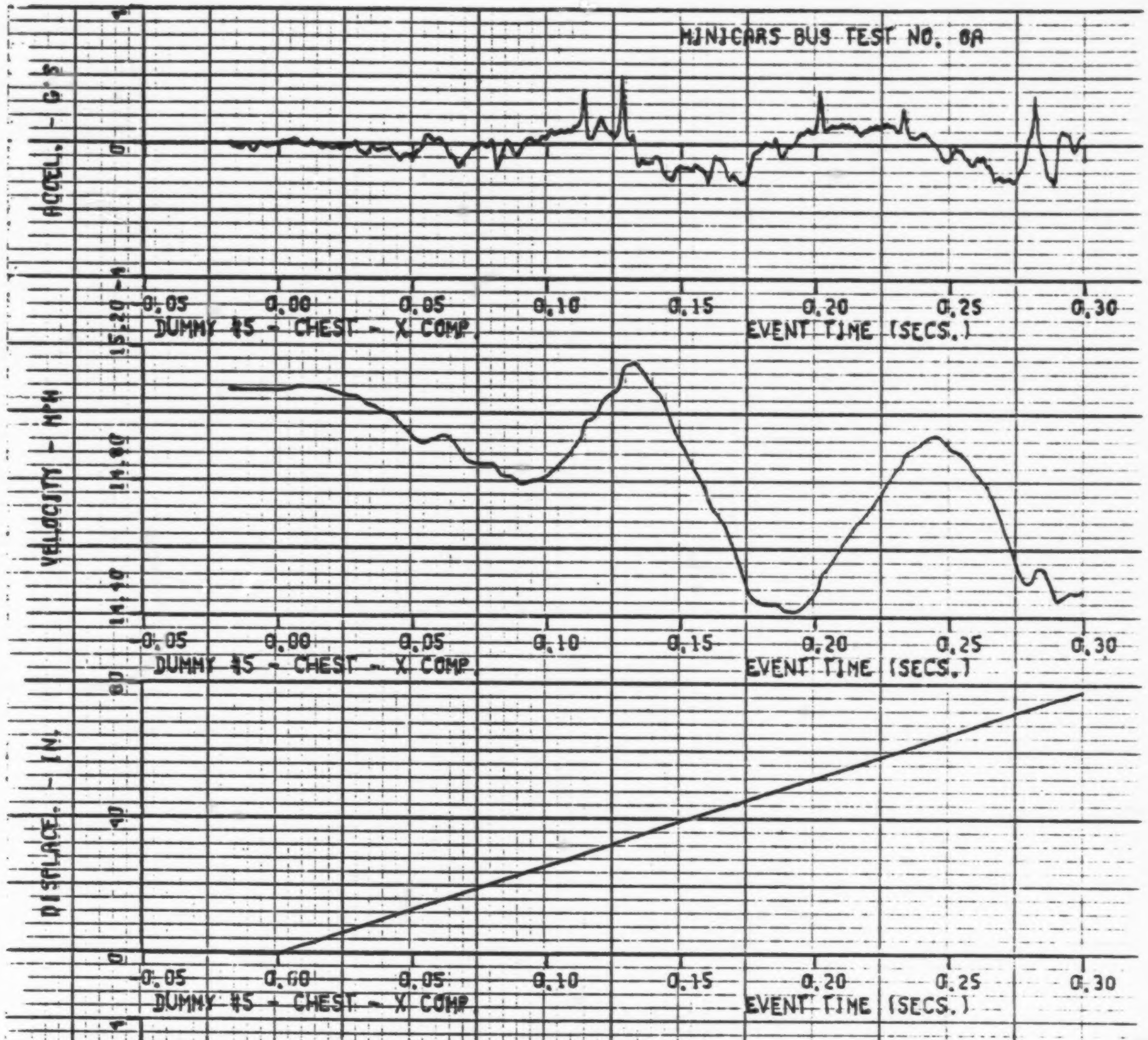
6440-V-4


MINICARS BUS TEST NO. 6A
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - HEAD - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - HEAD - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - HEAD - Z COMP.
EVENT TIME (SECS.)

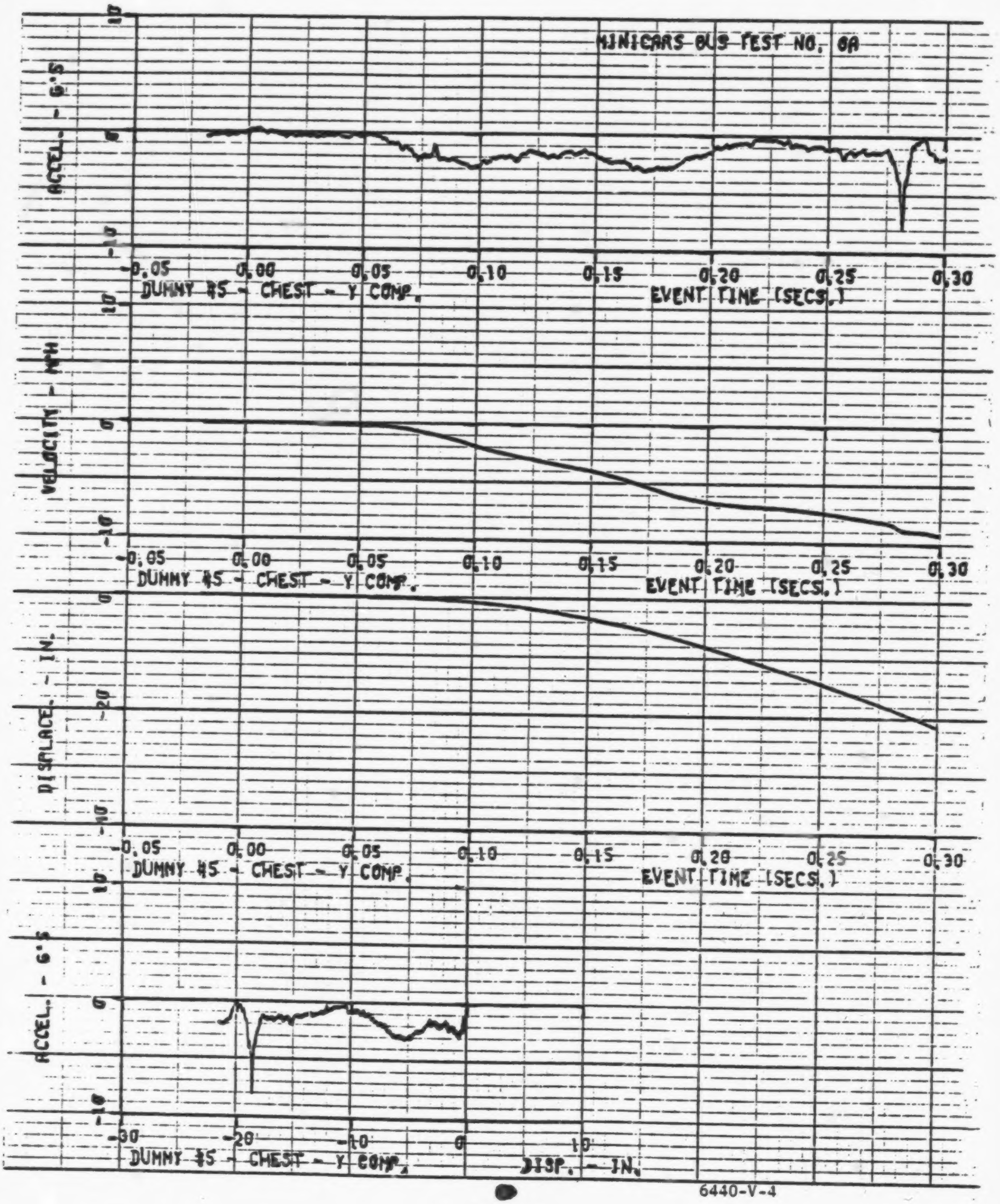
6440-V-4


MINICARS BUS TEST NO. 8A
ACCEL. - G'S
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - HEAD
EVENT TIME (SECS.)

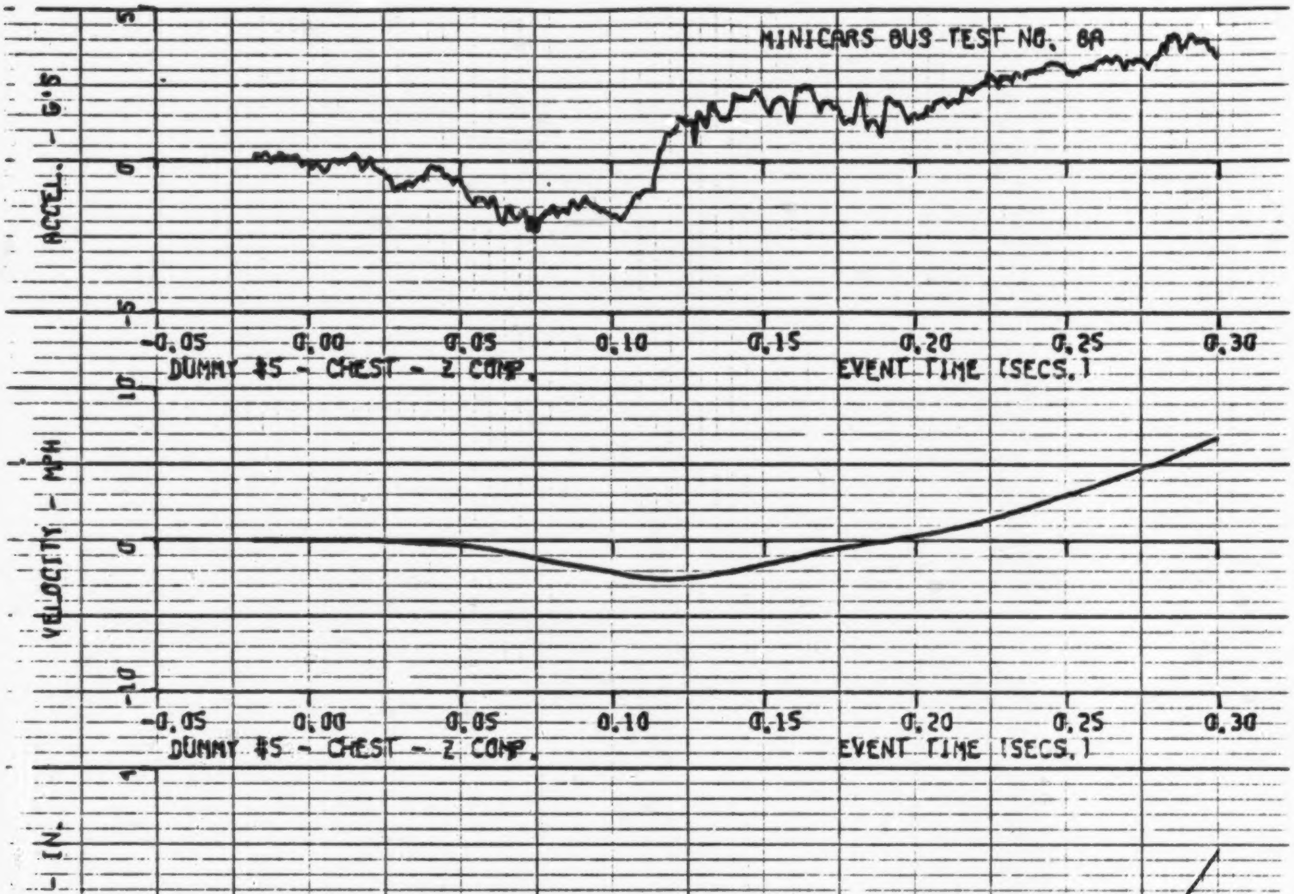
6440-V-4


MINICARS BUS TEST NO. 6A
ACCEL. - G'S
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - X COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
15.20
14.80
14.40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - X COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
80
40
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
4
0
-4
0
20
40
60
80
DUMMY #5 - CHEST - X COMP.
DISP. - IN.

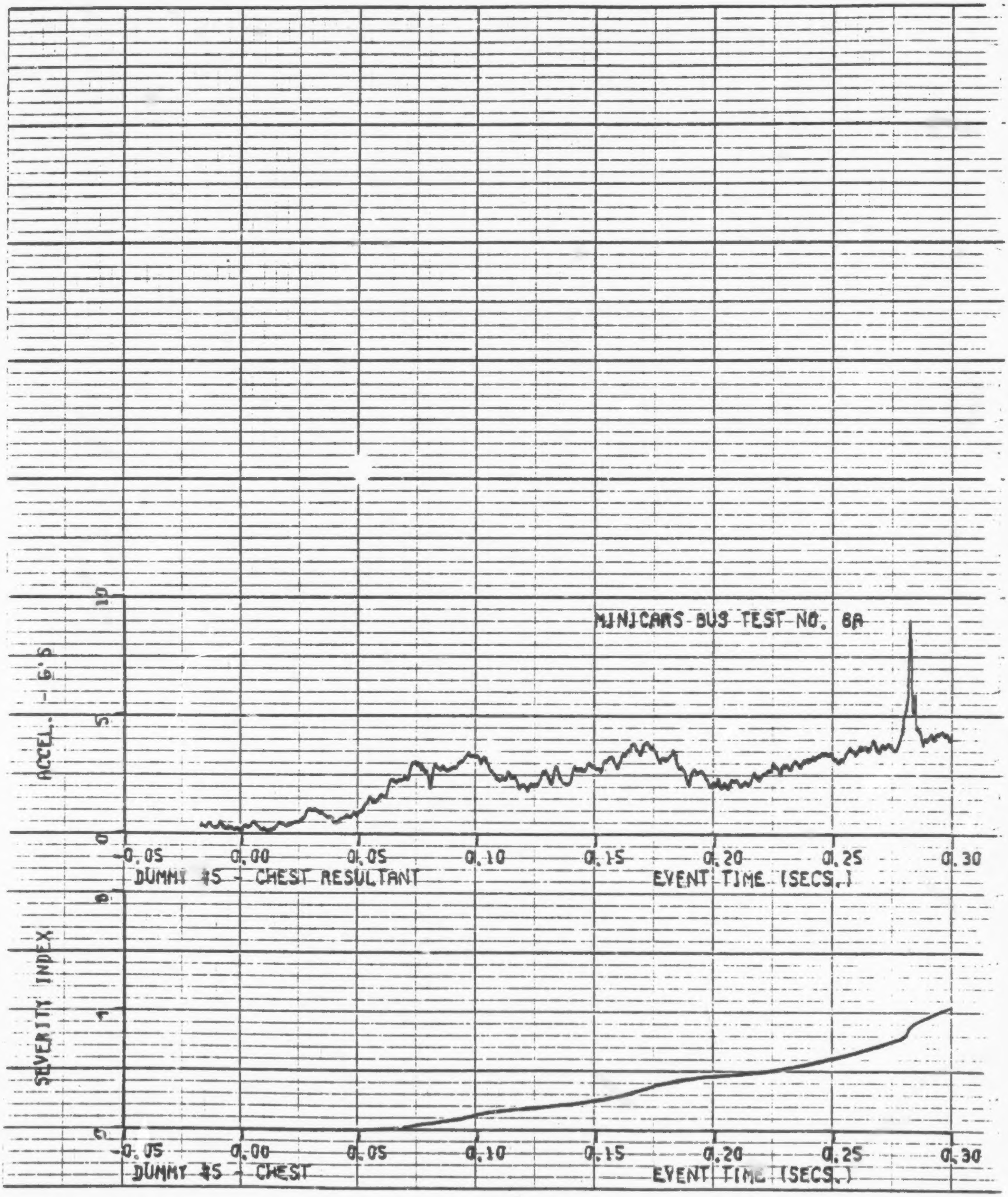
6440-V-4

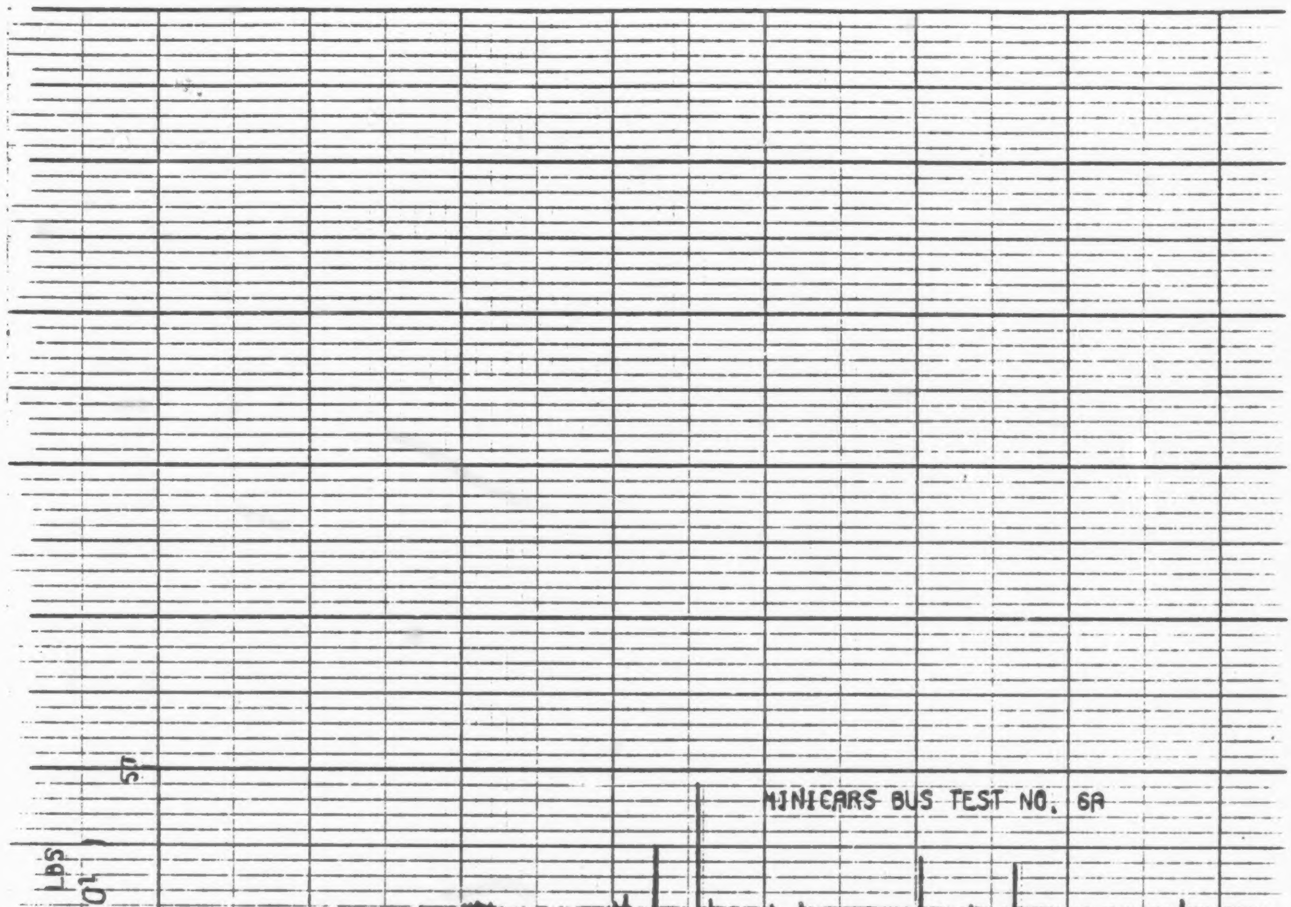

MINICARS BUS TEST NO. 8A
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Y COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Y COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-20
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-30
-20
-10
0
10
DUMMY #5 - CHEST - Y COMP.
DISP. - IN.

6440-V-4

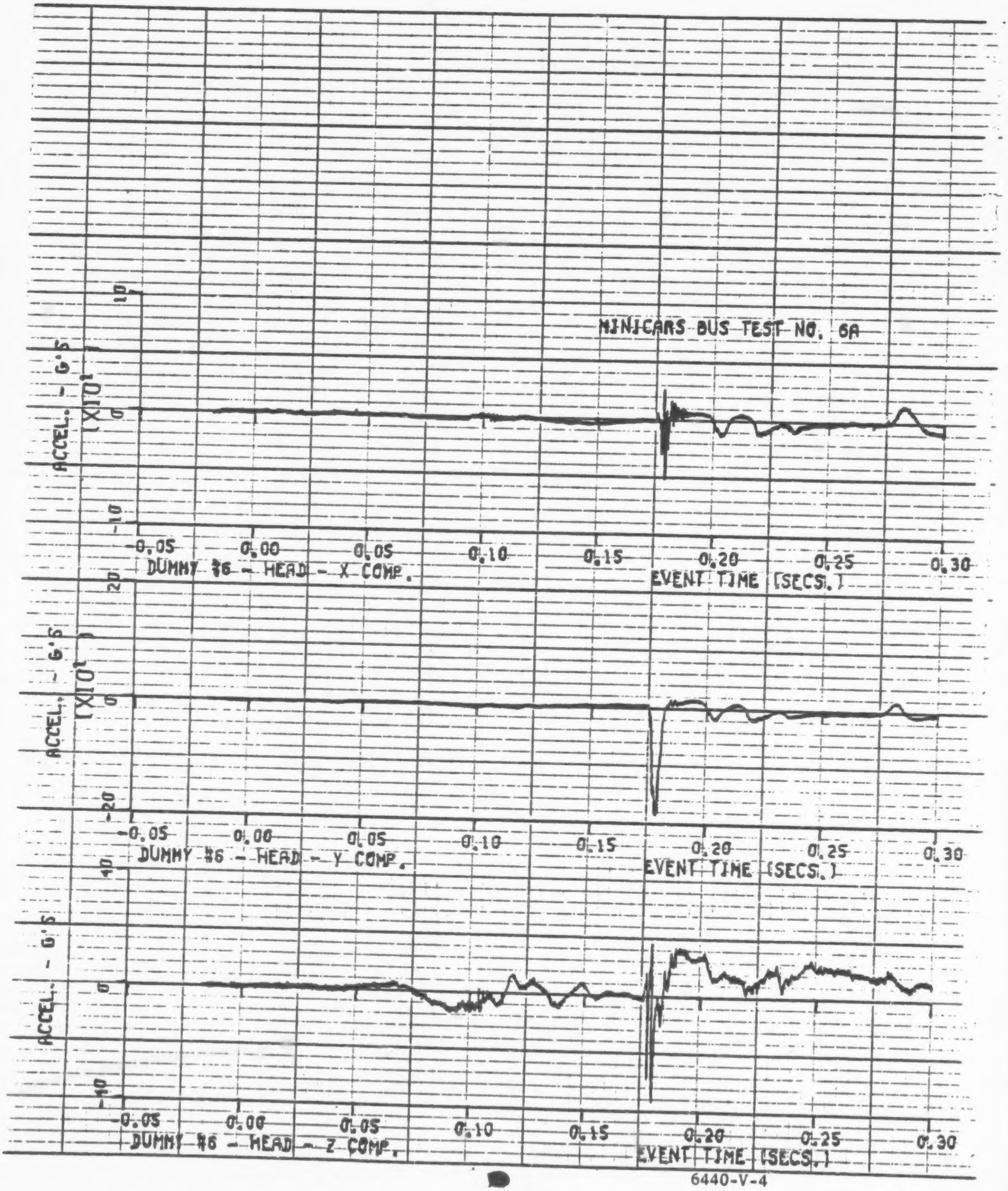

MINICARS BUS TEST NO. 6A
ACCEL. - G'S
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Z COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Z COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Z COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
5
0
-5
-4
-2
0
2
4
DUMMY #5 - CHEST - Z COMP.
DISP. - IN.

6440-V-4

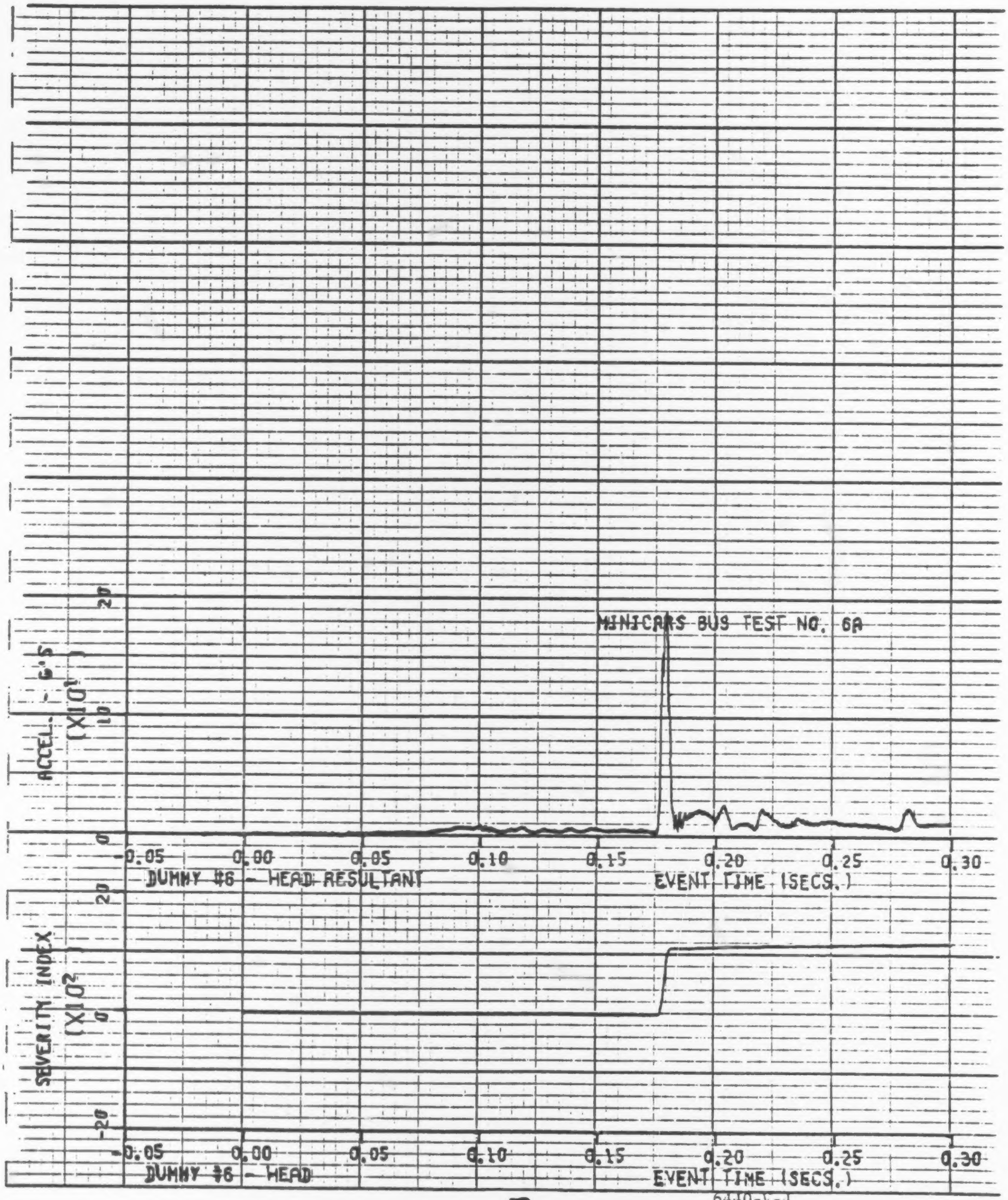

MINICARS BUS TEST NO. 8A
ACCEL. - G'S
10
5
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
8
4
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST
EVENT TIME (SECS.)


MINICARS BUS TEST NO. 6A
LOAD - LBS (X10¹)
50
0
-50
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - LEFT FEMUR
EVENT TIME (SECS.)
LOAD - LBS (X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - RIGHT FEMUR
EVENT TIME (SECS.)

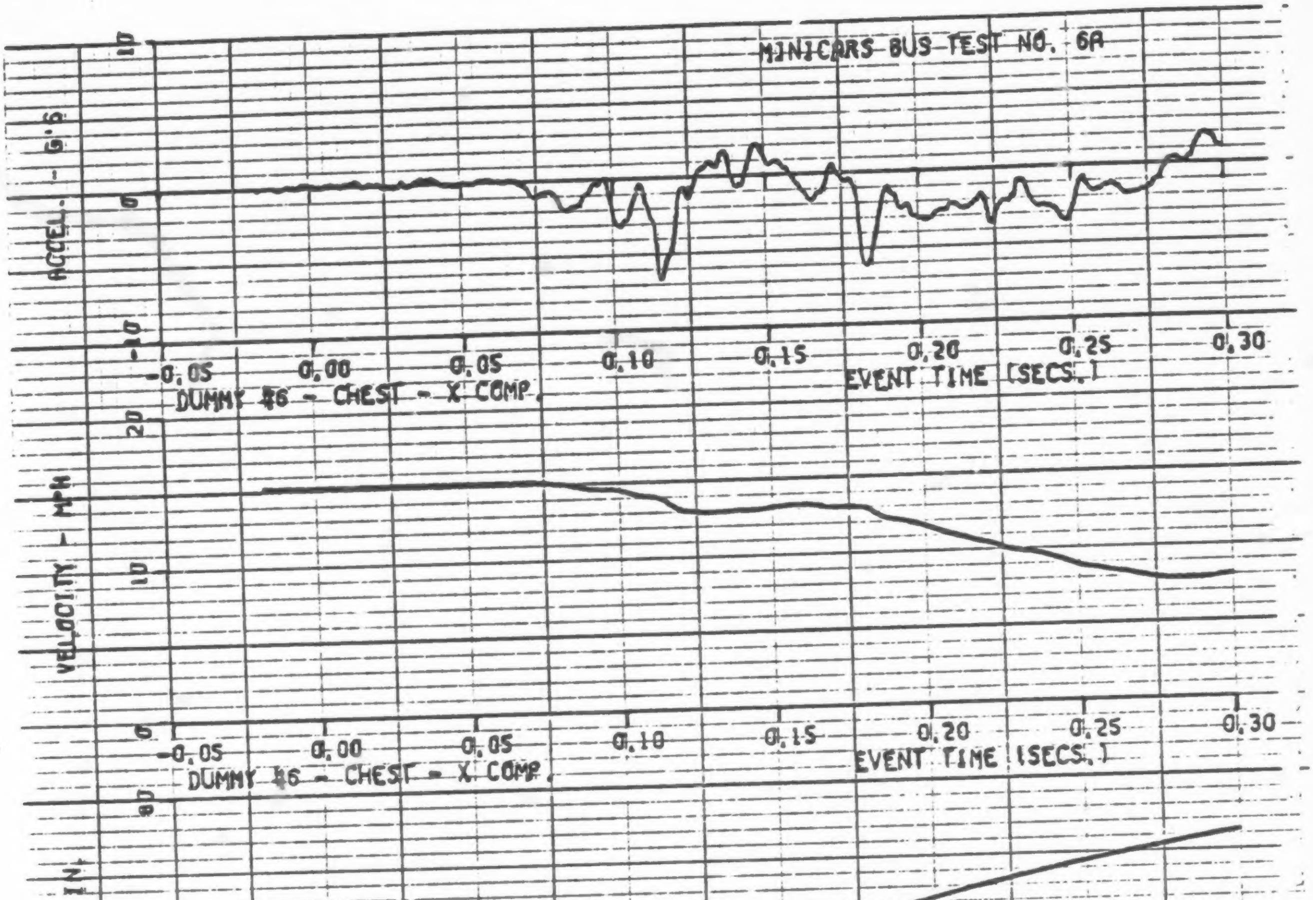
6440-V-4


MINICARS BUS TEST NO. 6A
ACCEL. - G'S (X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S (X10¹)
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD - Z COMP.
EVENT TIME (SECS.)

6440-V-4

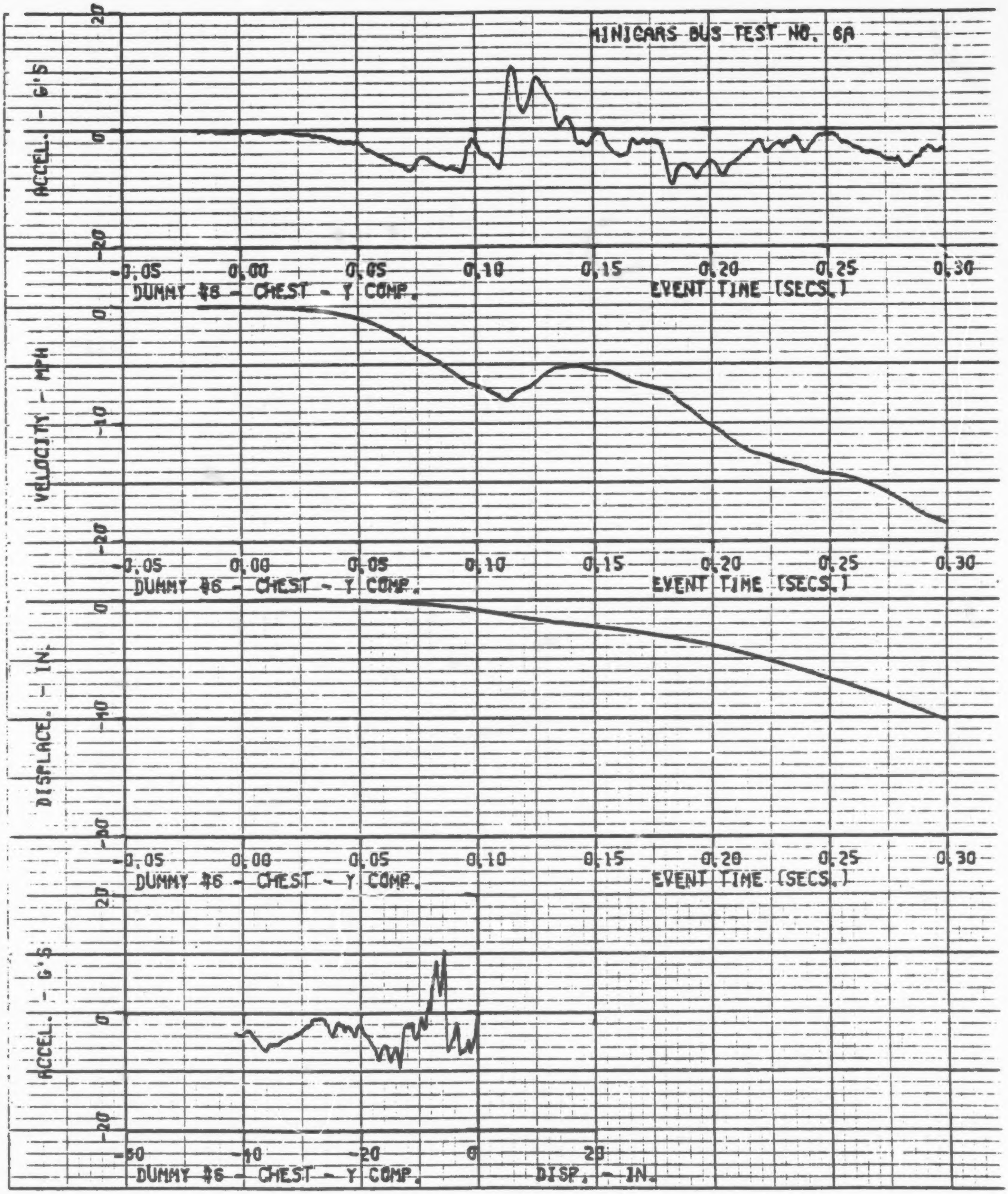

MINICARS BUS TEST NO. 6A
ACCEL. - G'S
(X10^1)
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
(X10^2)
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD
EVENT TIME (SECS.)

6440-V-4

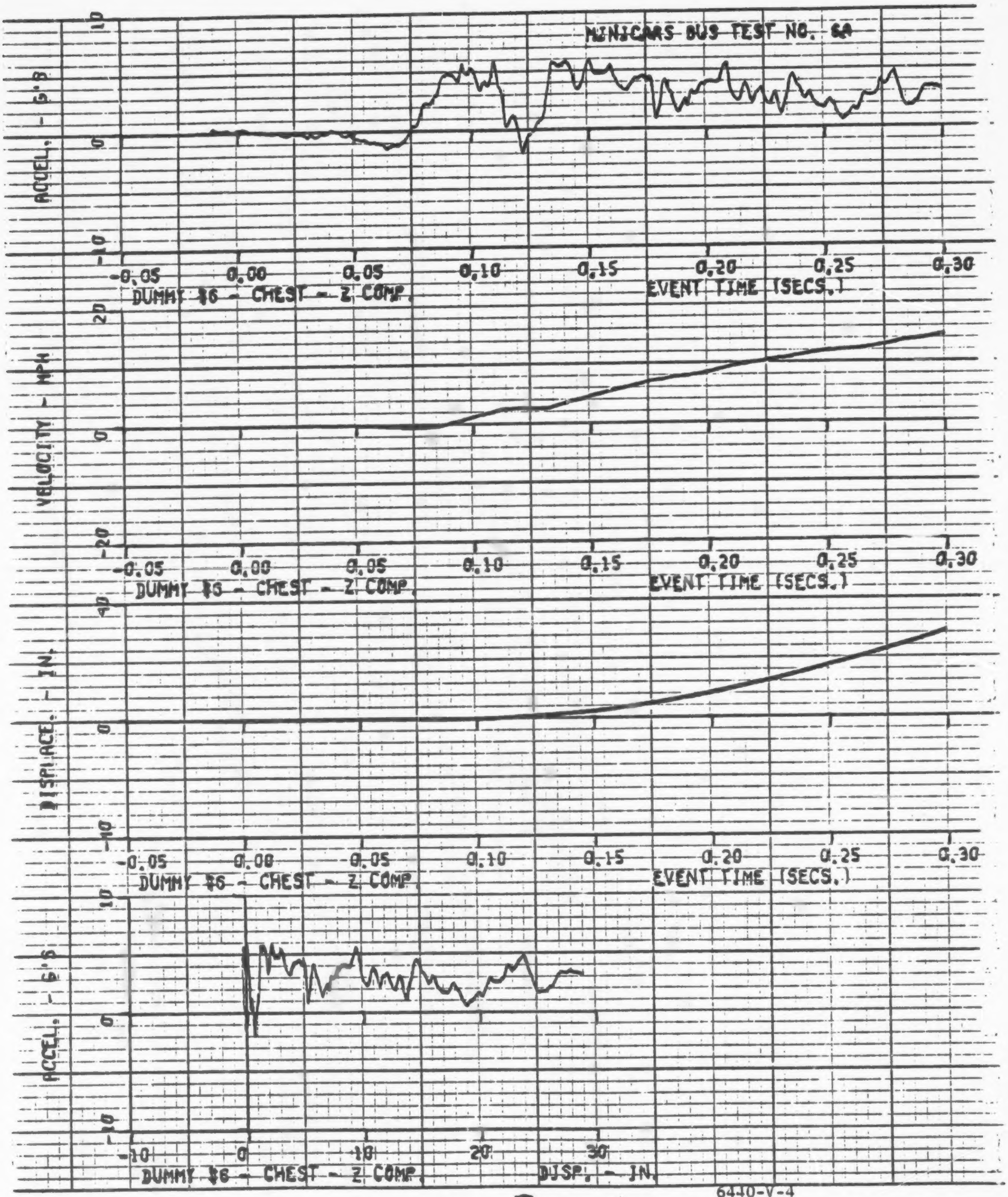

MINICARS BUS TEST NO. 6A
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
DUMMY #6 - CHEST - X COMP.
VELOCITY - MPH
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
DUMMY #6 - CHEST - X COMP.
DISPLACE. - IN.
80
40
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
DUMMY #6 - CHEST - X COMP.
ACCEL. - G'S
10
0
-10
0
20
40
60
80
DUMMY #6 - CHEST - X COMP.
DISP. - IN.

6440-V-4

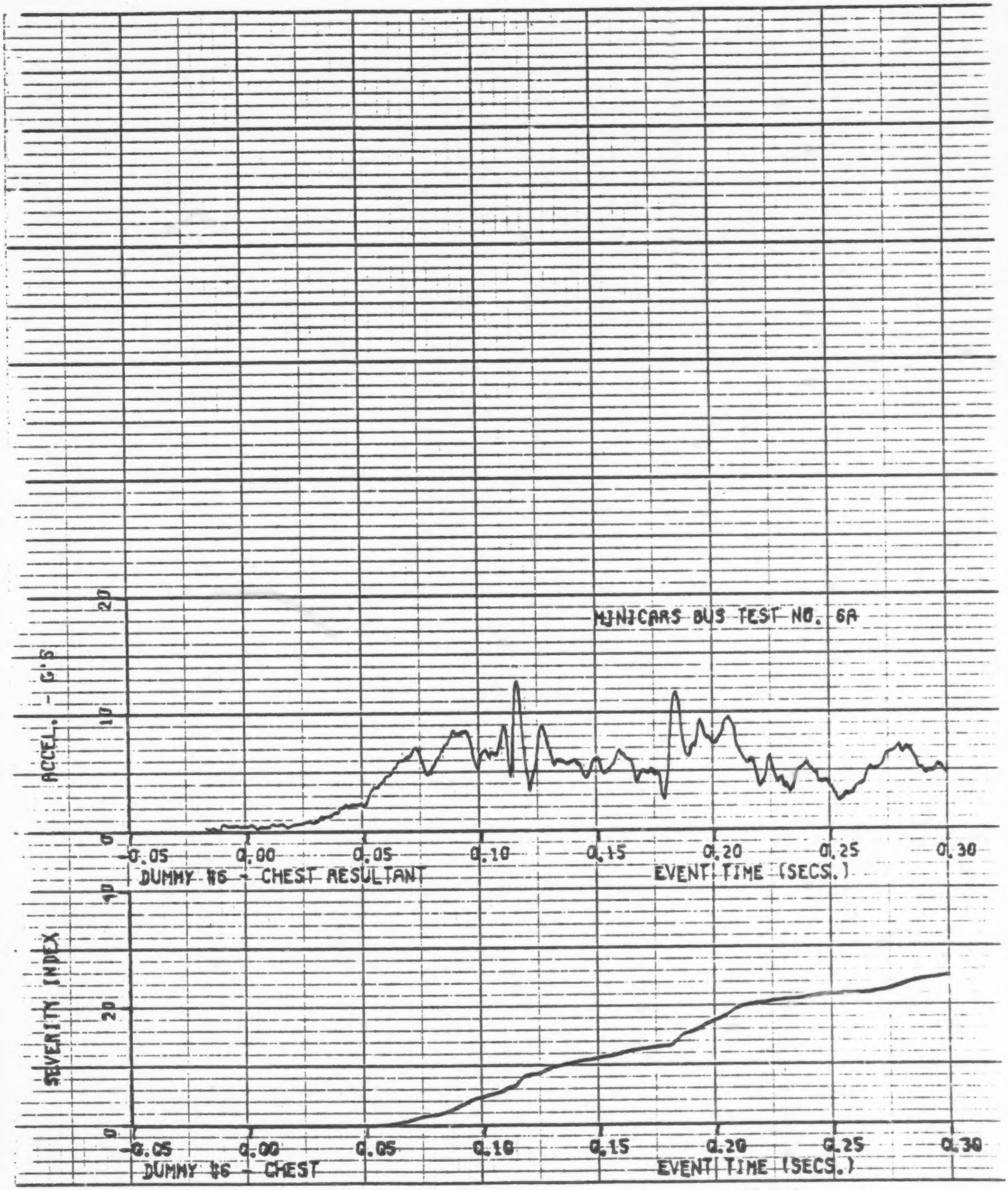
398


MINICARS BUS TEST NO. 6A
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Y COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
0
-10
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Y COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-10
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-30
-10
-20
0
20
DUMMY #6 - CHEST - Y COMP.
DISP. - IN.

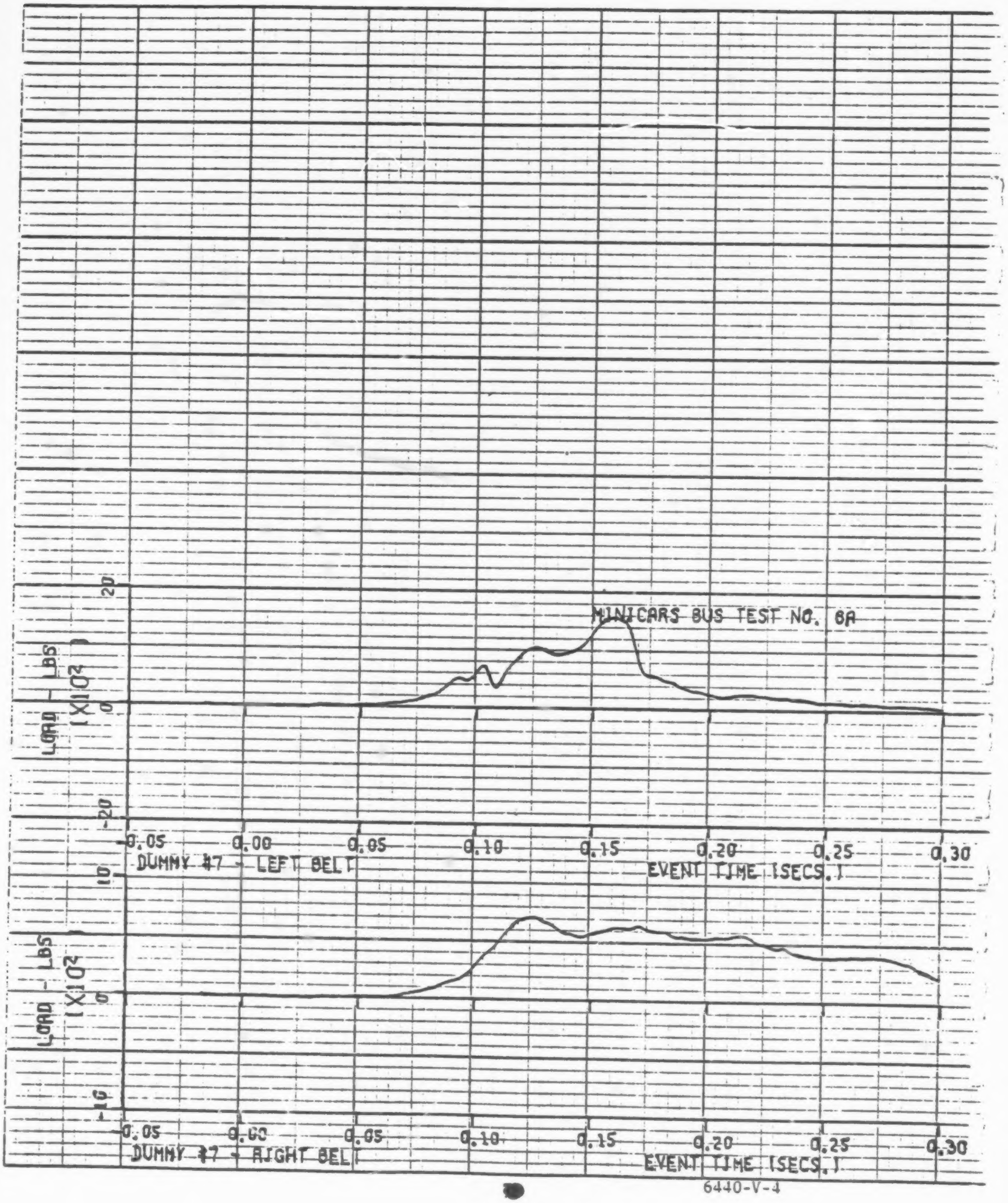
6440-V-4


MINICARS BUS TEST NO. 6A
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Z COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Z COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
40
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Z COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-10
0
10
20
30
DUMMY #6 - CHEST - Z COMP.
DISP. - IN.

6440-V-4


MINICARS BUS TEST NO. 6A
ACCEL. - G'S
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST
EVENT TIME (SECS.)

6440-V-4


MINICARS BUS TEST NO. 6A
LOAD - LBS
(X10²)
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - LEFT BELT
EVENT TIME (SECS.)
LOAD - LBS
(X10²)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - RIGHT BELT
EVENT TIME (SECS.)

6440-V-4

Table 5

CRASH TEST SUMMARY

TEST NO. 6B **PROJECT** MINICARS BUS TEST

DATE 3/21/79 **TIME** 2:45 pm **TEMP.** 60°F

TEST CONDITION FRONTAL PERPENDICULAR FIXED BARRIER (20 MPH)

VEHICLE NO. 1 CROWN COACH BUS

VEHICLE NO. 2 ______

	VEH. NO. 1
TEST WEIGHT (lbs)	27460
IMPACT ANGLE (deg)*	0
IMPACT VELOCITY (mph)**	21.22
MAX. CRUSH (in)	25.25

DUMMIES **VEH. NO. 1**

TYPE 5 - 50%
2 - 6-YEAR OLD CHILD DUMMIES

LOCATION SEE FIGURE 18

RESTRAINT SEE FIGURE 18

NUMBER OF DATA CHANNELS 72

NUMBER OF HIGH SPEED CAMERAS 12

---

*WITH RESPECT TO TOW TRACK CENTERLINE

**SPEED TRAP MEASUREMENT (±0.5% ACCURACY)

6440-V-4

GENERAL COMMENTS - TEST NO. 6B

No. 2 DUMMY - Bad signal from transducer.

Tie-downs of both wheelchairs failed.

Seat in-back-of driver came loose from floor due to loading by dummy from behind.

Back of seat in front of child and 50% dummy was damaged due to knees of both dummies.

Table 6

DUMMY INJURY CRITERIA VALUES

BUS TEST NO. 6B

	MAXIMUM ACCELERATION (G)*								SEVERITY INDEX	
	X	Y	Z	R	X	Y	Z	R	HEAD	CHEST
DUMMY (1)	80	-120	80	160	-24	11	32	36	4000	140
DUMMY (2)	12.8	9.5	22	28	11	28	7	38	160	83
DUMMY (3)	-40	4	34	48	-47	-4	10.5	48	240	160
DUMMY (4)	-90	-13	36	92	-21	-9	12	25	660	90
DUMMY (5)	-35	-15	28	48	-30	-12	15.5	35	175	85
DUMMY (6)	-40	-160	21	170	-18	-16.5	11	19.5	2500	88
DUMMY (7)	-27	8	36	44	23	-9	12	25	460	120

	MAXIMUM FORCE - SEAT BELT LOADS (LBS)	
	RIGHT BELT LOADS	LEFT BELT LOAD
DUMMY (1)	430	550
DUMMY (2)	430	*
DUMMY (7)	990	1760

	MAXIMUM FORCE - FEMUR LOADS (LBS)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY 3	880	900
DUMMY 5	350	100

		HEAD INJURY CRITERIA		
	HIC	t_1(SEC)	t_2(SEC)	AVE. ACC. (G) t_1 TO t_2
DUMMY (1)	2473	.063	.068	199
DUMMY (2)	122	.076	.276	12.9
DUMMY (3)	162	.101	.121	36.5
DUMMY (4)	465	.108	.118	72.3
DUMMY (5)	77.9	.247	.269	26.1
DUMMY (6)	1983	.125	.129	180
DUMMY (7)	342	.144	.203	32.0

*BAD SIGNAL FROM TRANSDUCER

Table 7

TEST NO. 6B BUS & AUTOMOBILE TEST WEIGHTS

BUS TEST WEIGHTS:

LEFT FRONT = 6310 LBS
RIGHT FRONT = 4810 LBS
TOTAL FRONT = 11,120 LBS

LEFT REAR = 8290 LBS
RIGHT REAR = 8050 LBS
TOTAL REAR 16,340 LBS

TOTAL WEIGHT = 11,120 LBS + 16,340 LBS = 27,460 LBS

WHEEL BASE = 258 INCHES

$$Cg_{FW} = \frac{16,340 \text{ X } 258}{27,460} = 153.52 \text{ INCHES}$$

Table 8

POST-CRASH DATA SHEET

BUS TEST NO. 6B

DIMENSIONS:

A = 12.5 INCHES

B = 12.25 INCHES

C = 108.25 INCHES

D = 106 INCHES

$E = \frac{A + B}{2} = 12.37$ INCHES (REBOUND)

$F = \frac{C + D}{2} = 107.12$ INCHES

G = F-E = 94.75 INCHES

CRUSH = 120-94.75 = 25.25 INCHES

408

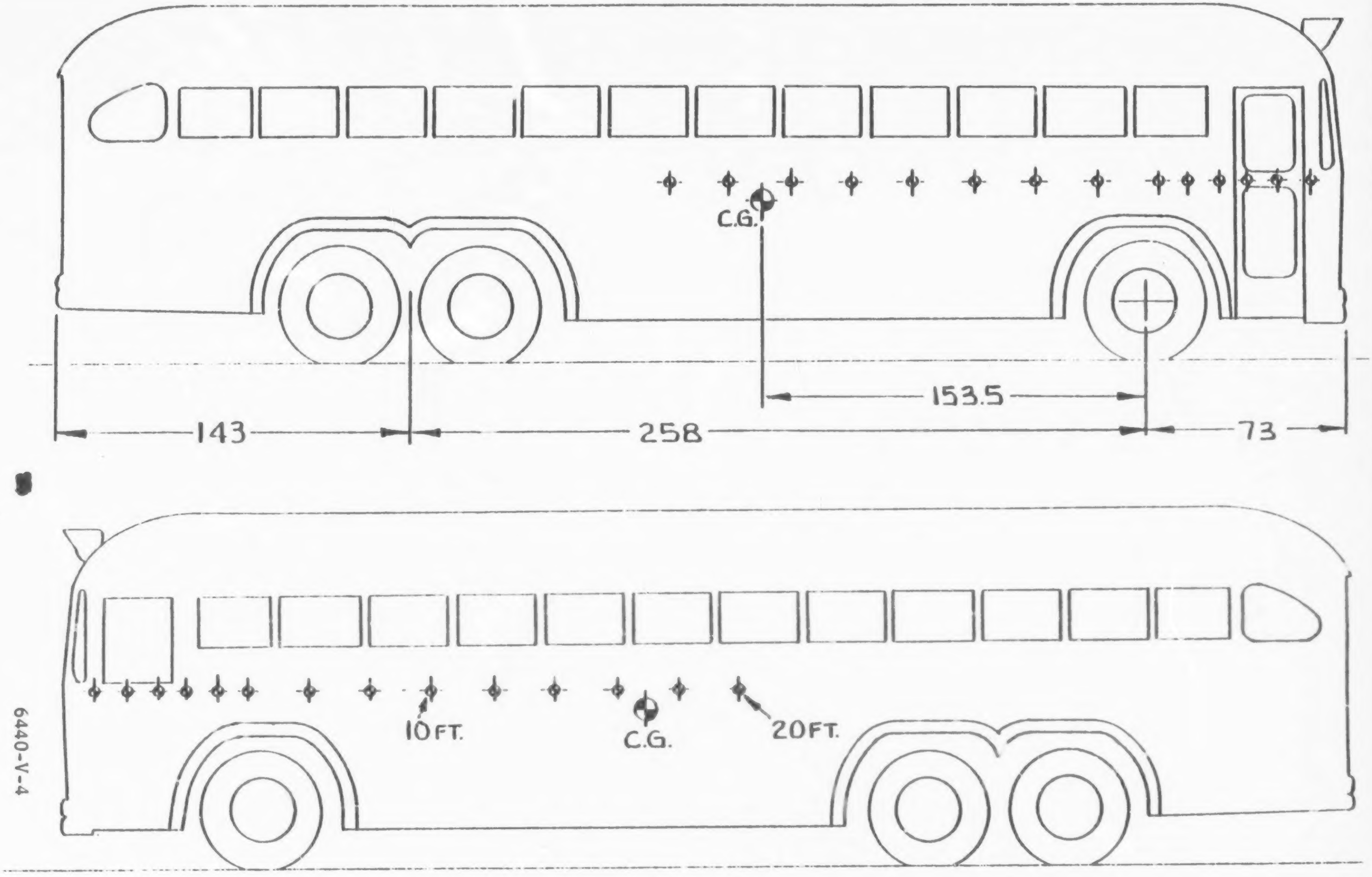

C.G.
153.5
143
258
73
10 FT.
C.G.
20 FT.
6440-V-4

FIGURE 12 VEHICLE DIMENSION & PHOTOGRAPHIC TARGETS FOR TEST NO. 6B

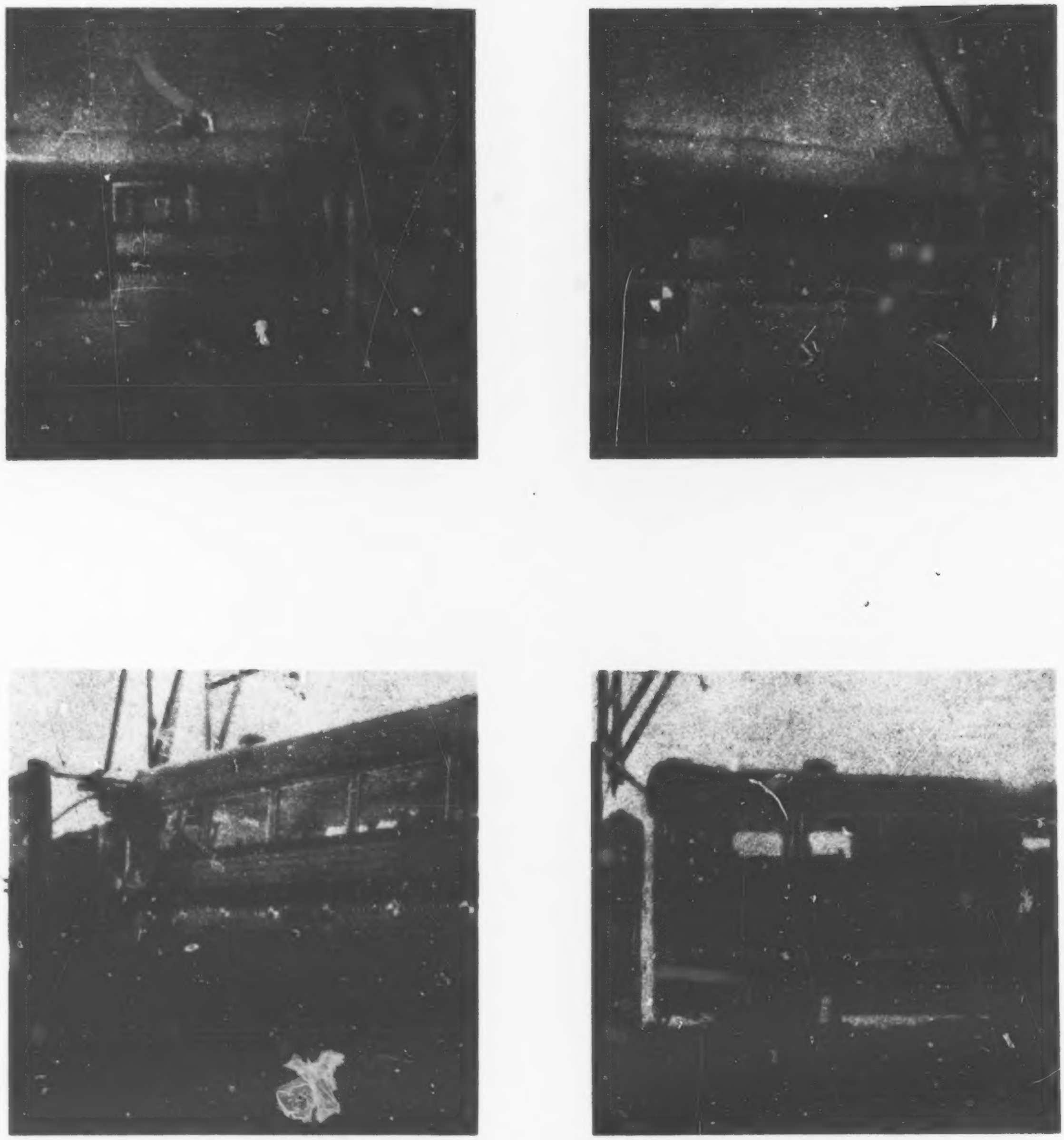


Figure 13 POST-TEST NO. 6B, EXTERIOR VIEWS, FRONTAL BARRIER TEST

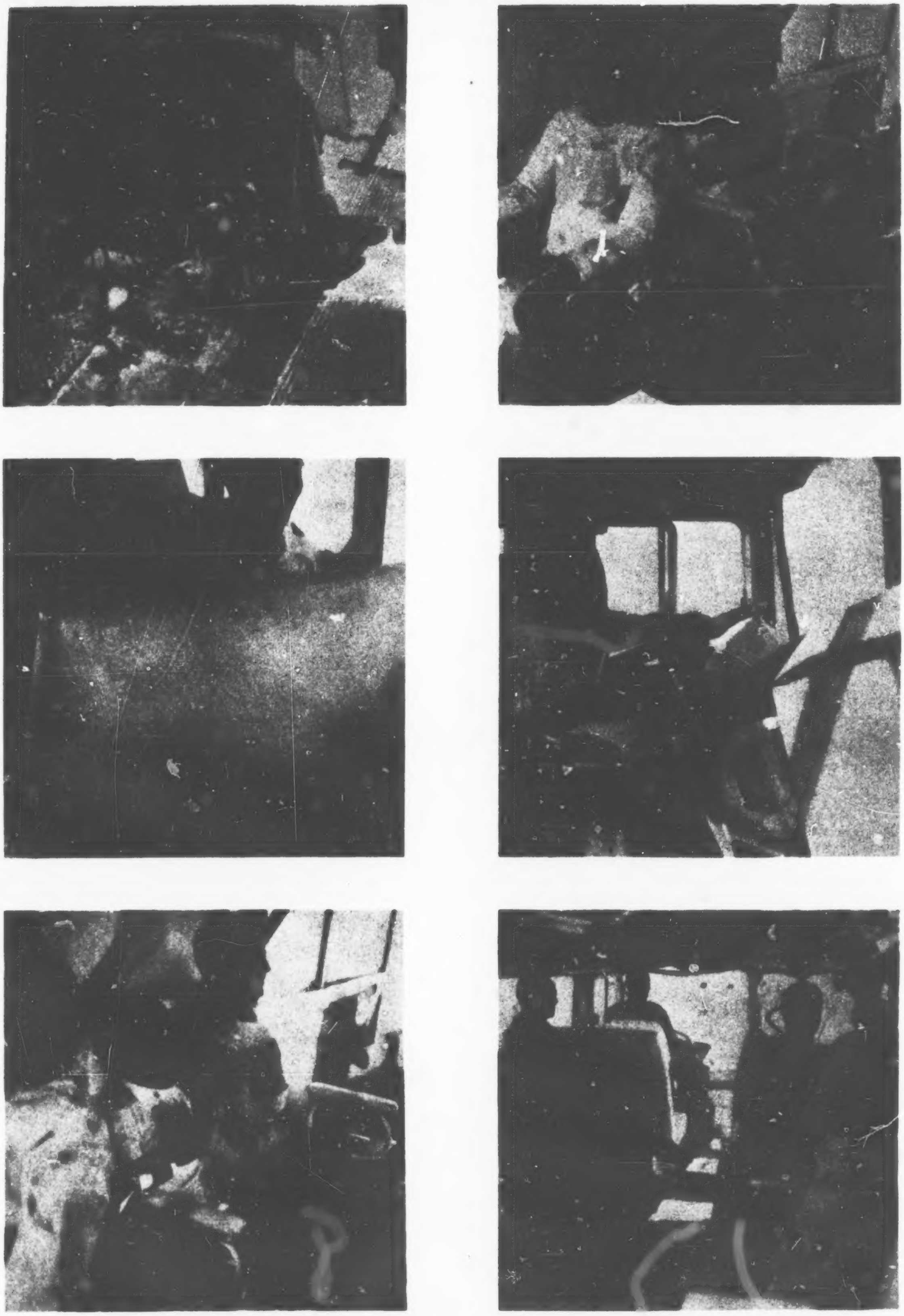


Figure 14 PRE-TEST NO. 6B, INTERIOR VIEWS, FRONTAL BARRIER TEST

6440-V-4

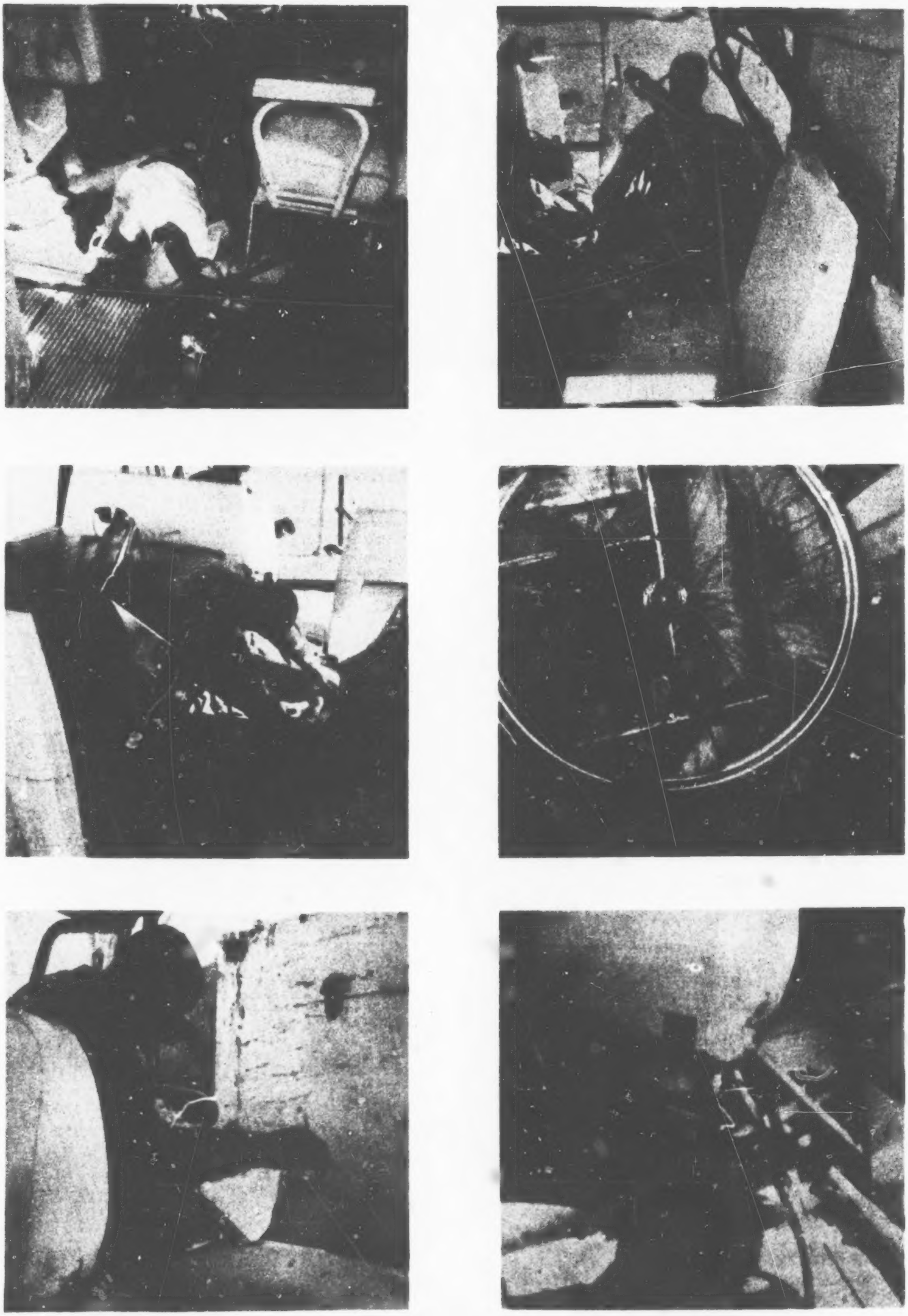
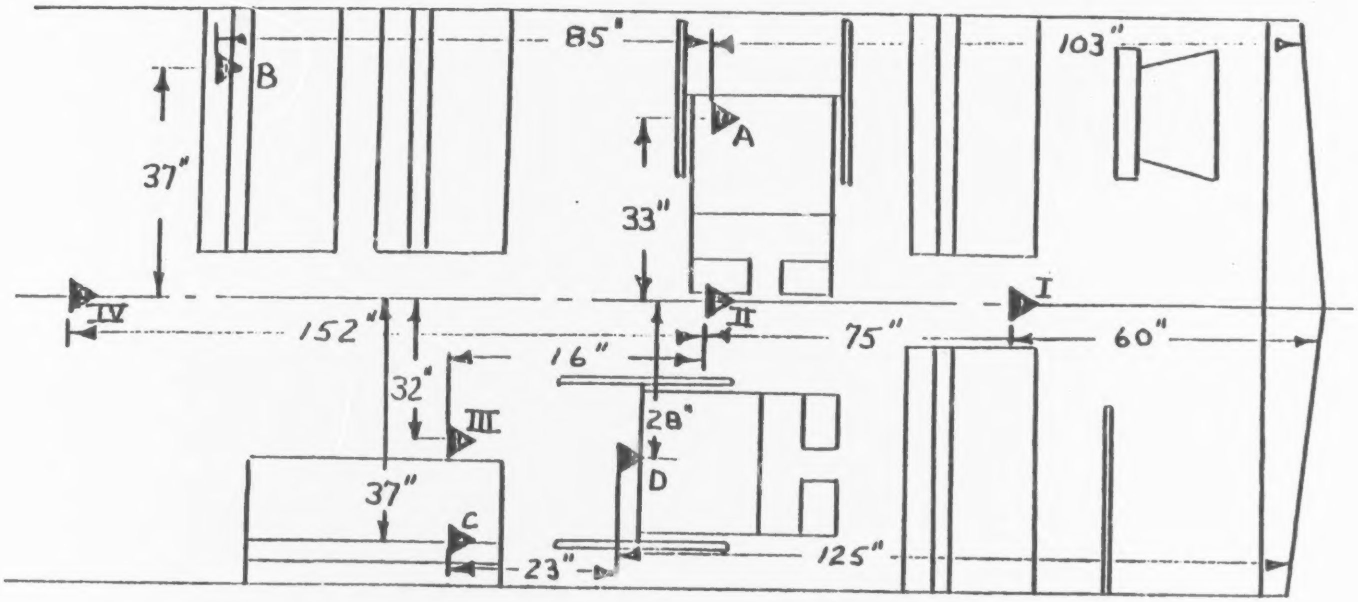
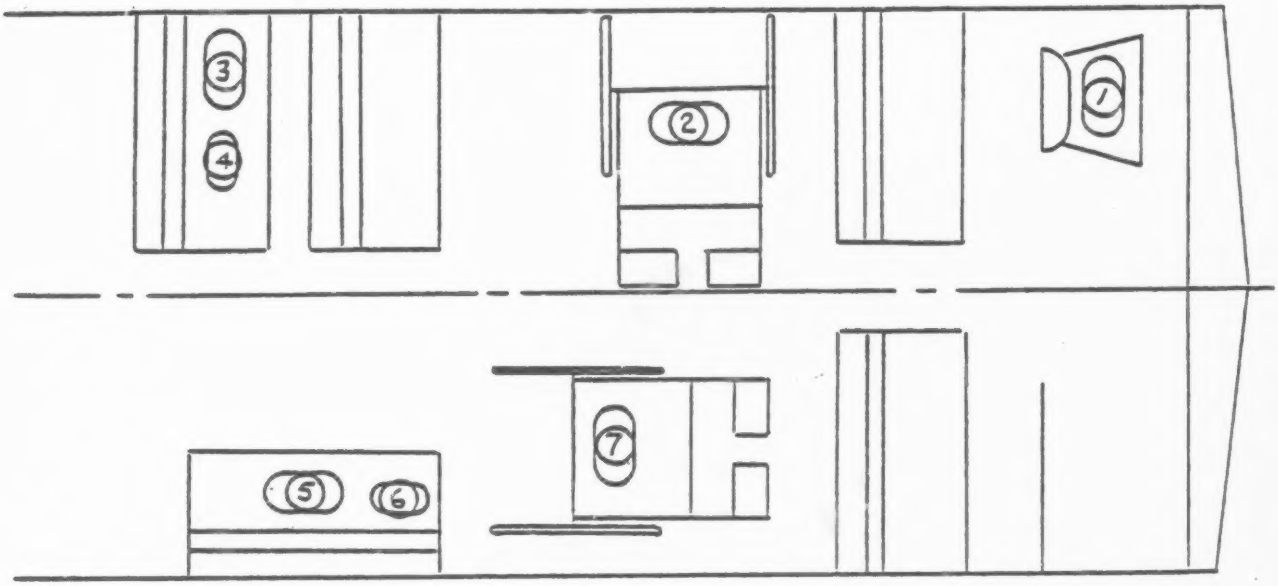


Figure 15 POST-TEST NO. 6B, INTERIOR VIEWS, FRONTAL BARRIER TEST


85"
103"
B
A
37"
33"
IV
152"
II
I
75"
60"
16"
32"
III
28"
D
37"
C
23"
125"

ACCEL. NO.	ACCEL. COMP.
I	X Y Z
II	X Y Z
III	X Y Z
IV	X Y Z
A	X Z
B	X Z
C	X Z
D	X Z

FIGURE 16 ACCELEROMETER LOCATIONS - TEST NO. 6B - FRONTAL BARRIER

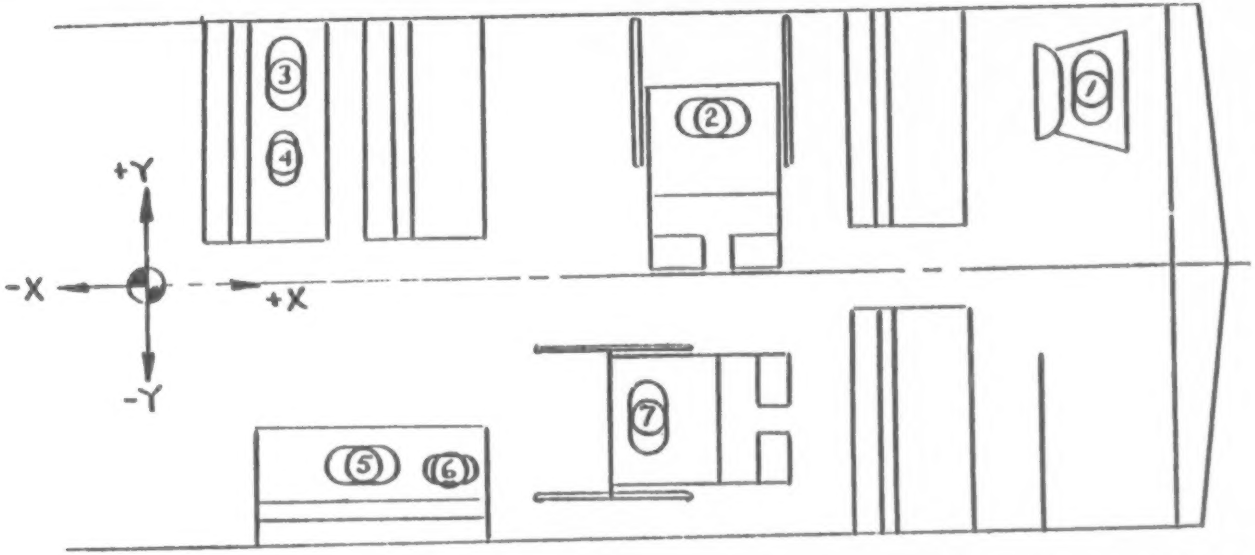


DUMMY	TRANDSUCERS			
POS. & TYPE	HEAD ACCEL.	CHEST ACCEL.	FEMUR LOAD	BELT LOAD
1 50%	X, Y, Z	X, Y, Z	--	RIGHT & LEFT
2 50%	X, Y, Z	X, Y, Z	--	RIGHT & LEFT
3 50%	X, Y, Z	X, Y, Z	RIGHT & LEFT	--
4 6-YR OLD	X, Y, Z	X, Y, Z	--	--
5 50%	X, Y, Z	X, Y, Z	RIGHT & LEFT	--
6 6-YR OLD	X, Y, Z	X, Y, Z	--	--
7 50%	X, Y, Z	X, Y, Z	--	RIGHT & LEFT

FIGURE 17 DUMMY SEATING POSITION & INSTRUMENTATION FOR FRONTAL BARRIER - TEST NO. 6B .

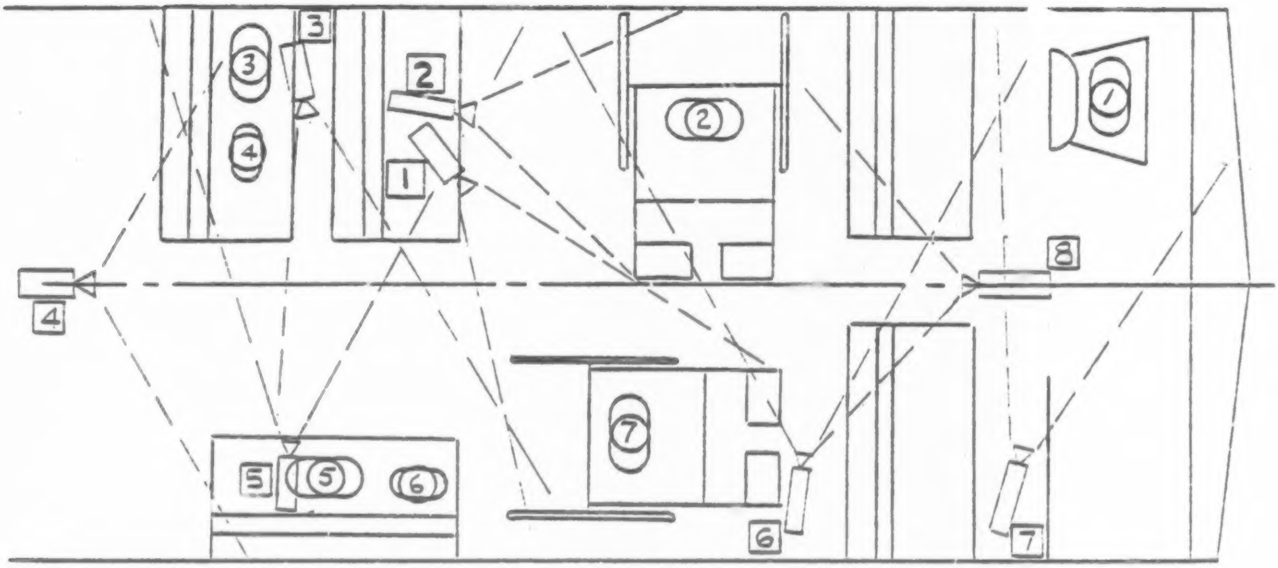
6440-V-4

414



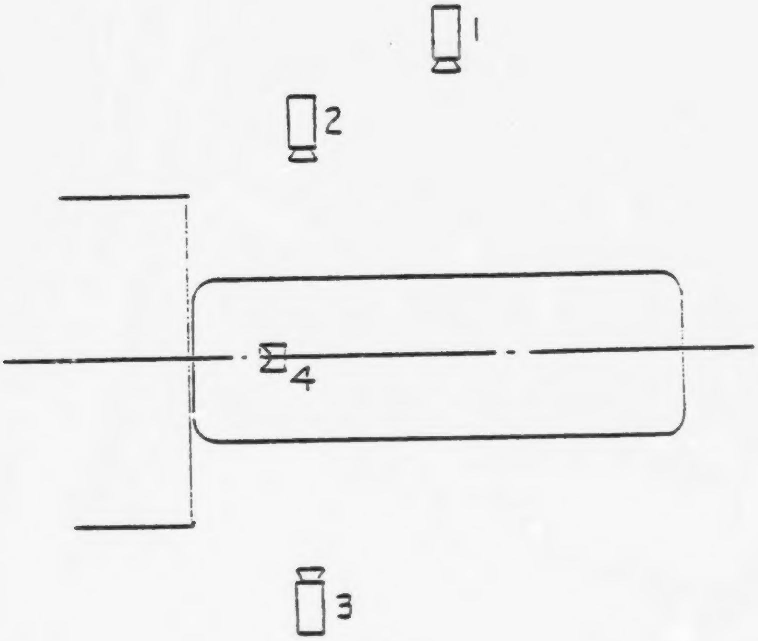
DUMMY POSITION		HEAD POINT (INCHES)			H POINT (INCHES)			KNEE POINT (INCHES)		
		X	Y	Z	X	Y	Z	X	Y	Z
(1)	PRE	179	-24	49	183¼	-20	22	199¼	17¾	23
	POST	188½	-20¼	41½	173½	-16¾	21	192	-17¾	23½
(2)	PRE	112	-32¾	48	108	-29¾	21	110	-10¾	23
	POST	115½	2½	26½	120¼	-27	21¾	118½	-10¾	15¼
(3)	PRE	39	-30½	44	37	-26½	19	51¾	-27¼	20½
	POST	45½	-16¼	42½	39½	-18½	17½	59¼	-22¼	17½
(4)	PRE	36½	-18¼	35½	37	-16½	17	46	-17¾	18
	POST	27¼	12½	2¼	50	4¾	8	49½	-6¾	2½
(5)	PRE	50½	34½	44	44¼	31¾	18½	45	15¼	20
	POST	94	29½	35½	76½	25	15	69½	12	19½
(6)	PRE	66¾	35¼	38	64¾	29½	18	64	19½	19½
	POST	85¼	39¼	20¼	82½	29	4½	77¼	18	2½
(7)	PRE	103	25¼	48	100½	18½	21	118	20½	24
	POST	104¼	23½	43½	100½	19¾	18½	115½	16¼	18

FIGURE 18 DUMMY LOCATIONS PRE- AND POST-TEST NO. 6B



LOCATION NO.	TYPE	LENS (MM)	SPEED (FPS)
1	PHOTOSONIC	8	350
2	PHOTOSONIC	8	200
3	STALEX	8	600
4	STALEX	8	600
5	STALEX	8	550
6	STALEX	8	600
7	STALEX	8	725
8	STALEX	8	800

FIGURE 19 ON-BOARD CAMERA COVERAGE FOR TEST NO. 6B

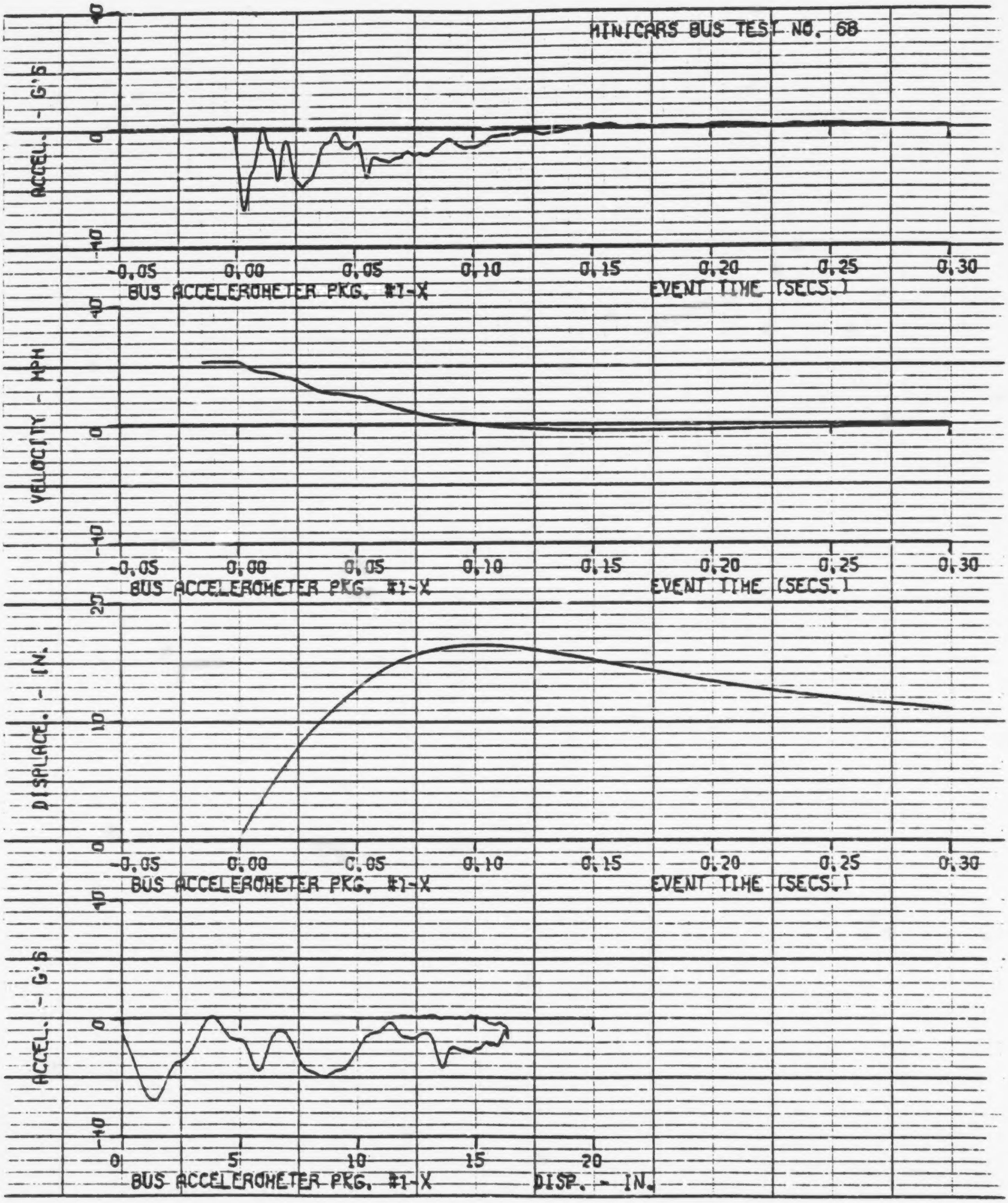


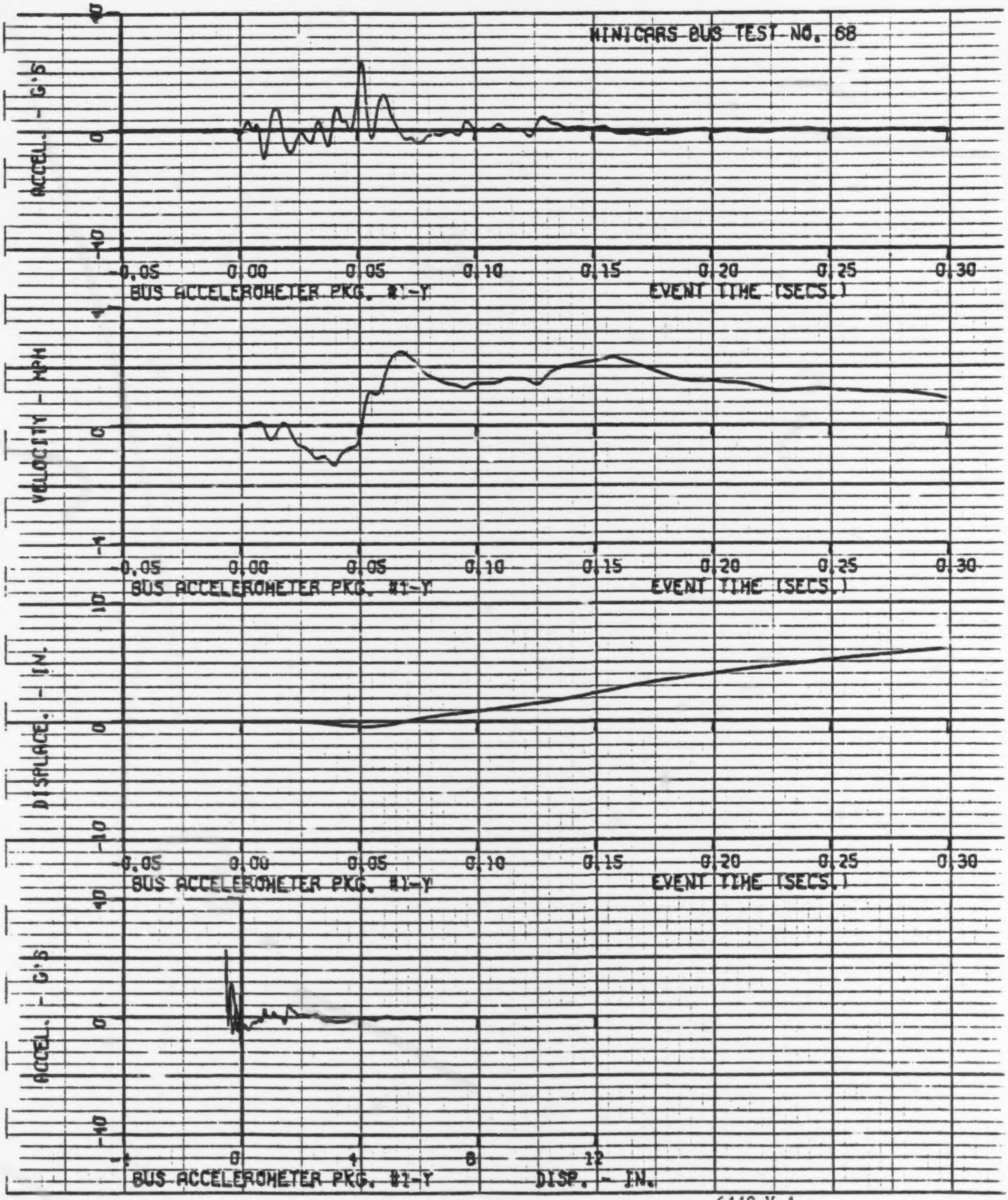
LOC. NO.	LOCATION	CAMERA TYPE	LENS (MM)	SPEED (FPS)
1	SOUTH WIDE	PHOTOSONIC	13	500
2	SOUTH CLOSE	PHOTOSONIC	25	700
3	NORTH CLOSE	PHOTOSONIC	25	600
4	PIT	PHOTOSONIC	13	No Pulse

FIGURE 20 OFF-BOARD CAMERA COVERAGE FOR TEST NO. 6B

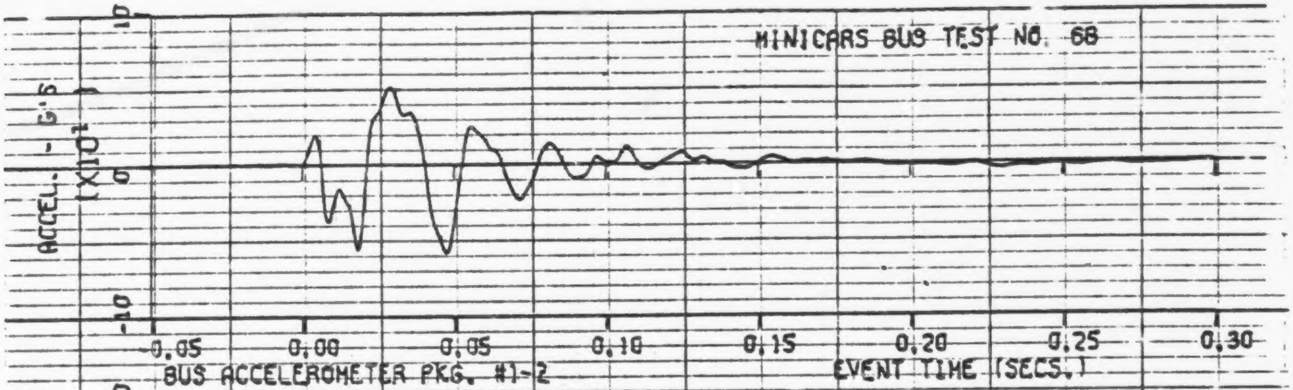
TEST NO. 6B DATA

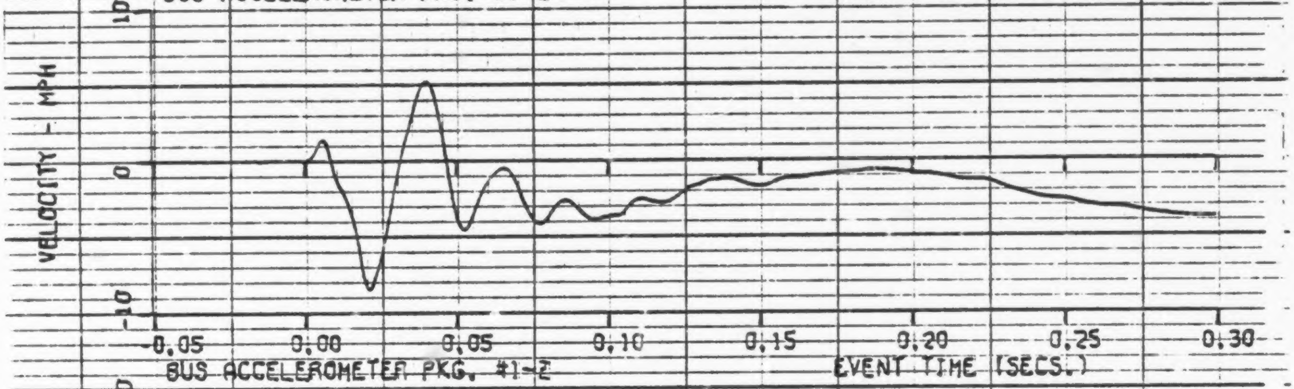
	FILTER CHANNEL CLASS
VEHICLE DATA	60
HEAD ACCELERATION	1000
CHEST ACCELERATION	180
BELT LOADS	60
FEMUR LOADS	600

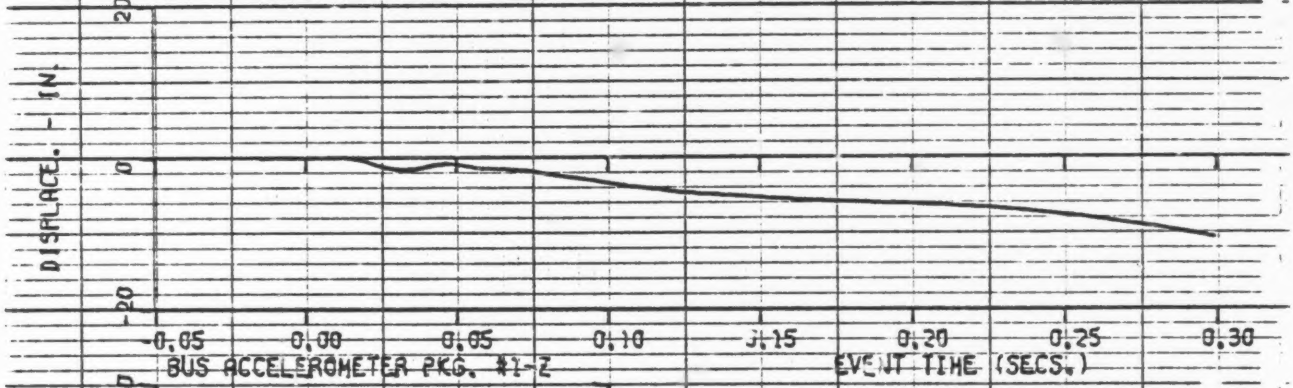

MINICARS BUS TEST NO. 68
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-X
EVENT TIME (SECS.)
VELOCITY - MPH
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-X
EVENT TIME (SECS.)
DISPLACE. - IN.
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-X
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
0
5
10
15
20
BUS ACCELEROMETER PKG. #1-X
DISP. - IN.

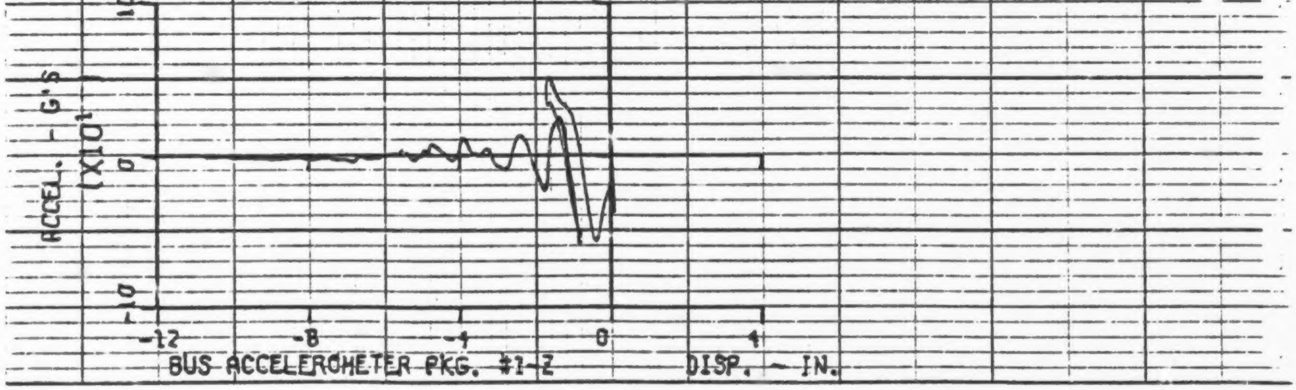

MINICARS BUS TEST NO. 68
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Y
EVENT TIME (SECS.)
VELOCITY - MPH
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Y
EVENT TIME (SECS.)
DISPLACE. - IN.
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Y
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-4
0
4
8
12
BUS ACCELEROMETER PKG. #1-Y
DISP. - IN.

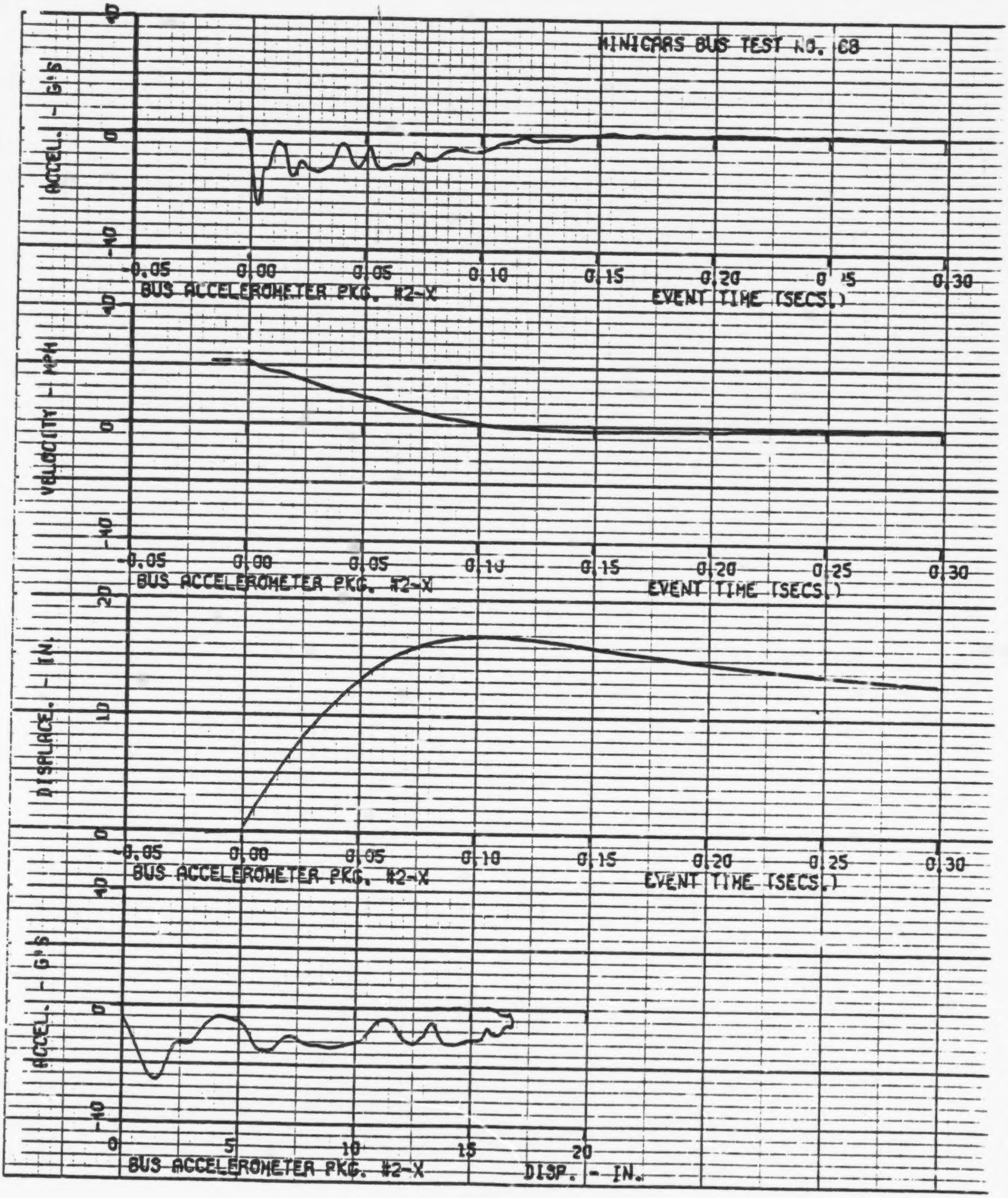
6440-V-4


MINICARS BUS TEST NO. 68
ACCEL. - G'S (X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Z
EVENT TIME (SECS.)

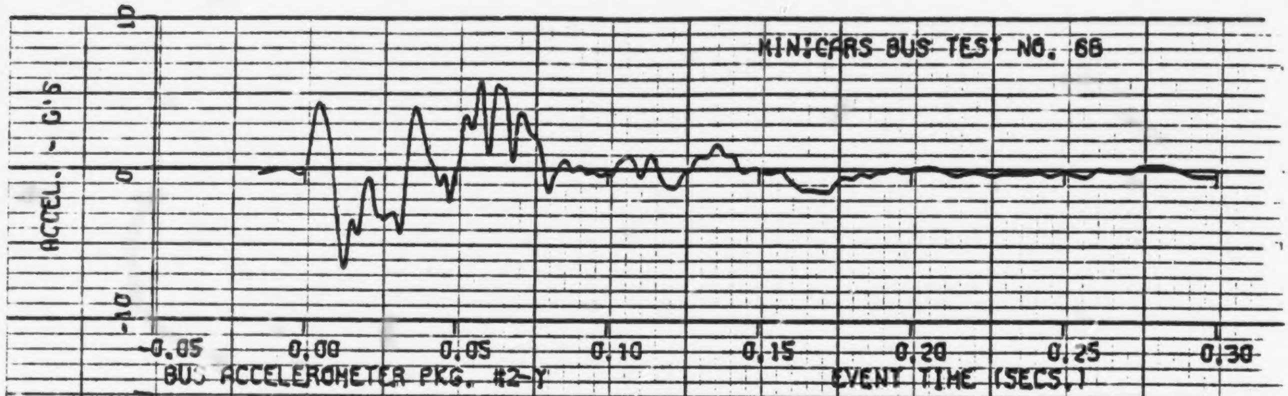

VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Z
EVENT TIME (SECS.)

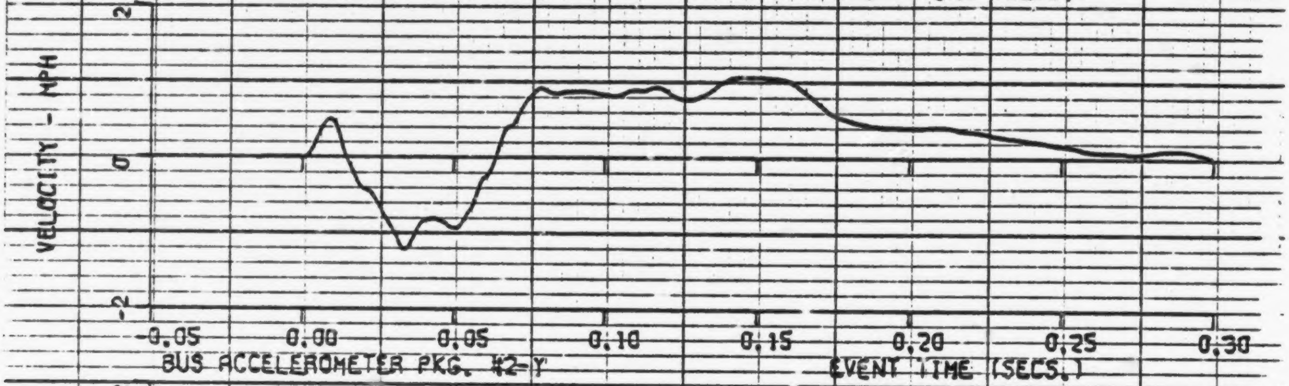

DISPLACE. - IN.
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Z
EVENT TIME (SECS.)

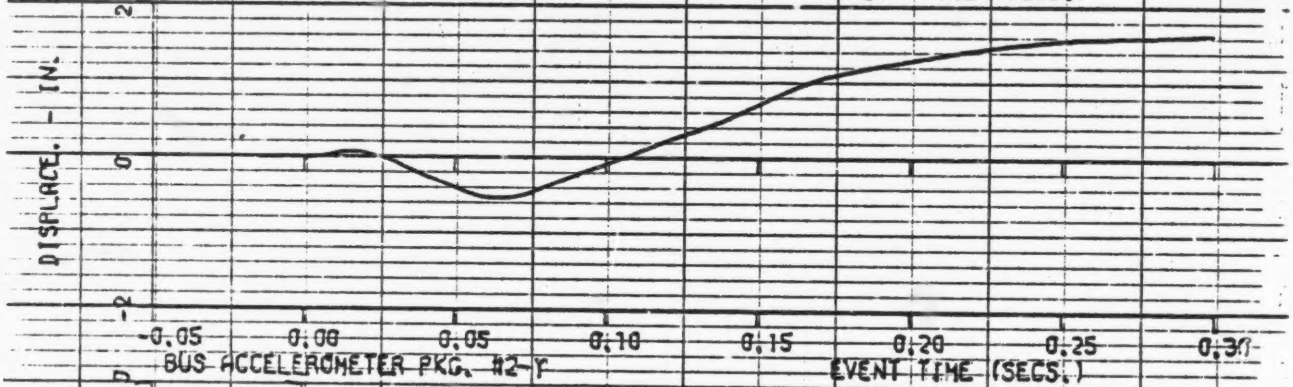

ACCEL. - G'S (X10¹)
10
0
-10
-12
-8
-4
0
4
BUS ACCELEROMETER PKG. #1-Z
DISP. - IN.

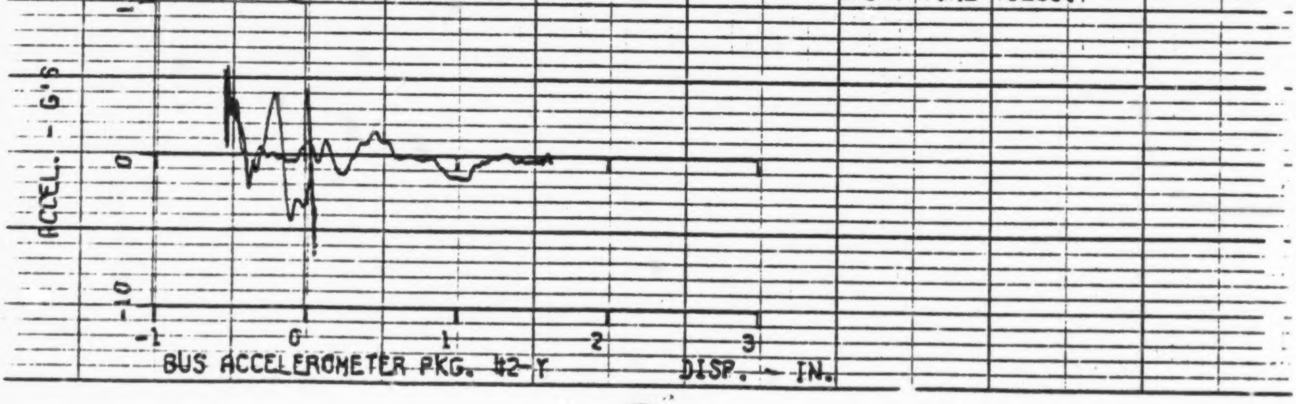

MINICARS BUS TEST NO. C8
ACCEL. - G'S
40
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-X
EVENT TIME (SECS.)
VELOCITY - MPH
40
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-X
EVENT TIME (SECS.)
DISPLACE. - IN.
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-X
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-10
0
5
10
15
20
BUS ACCELEROMETER PKG. #2-X
DISP. - IN.

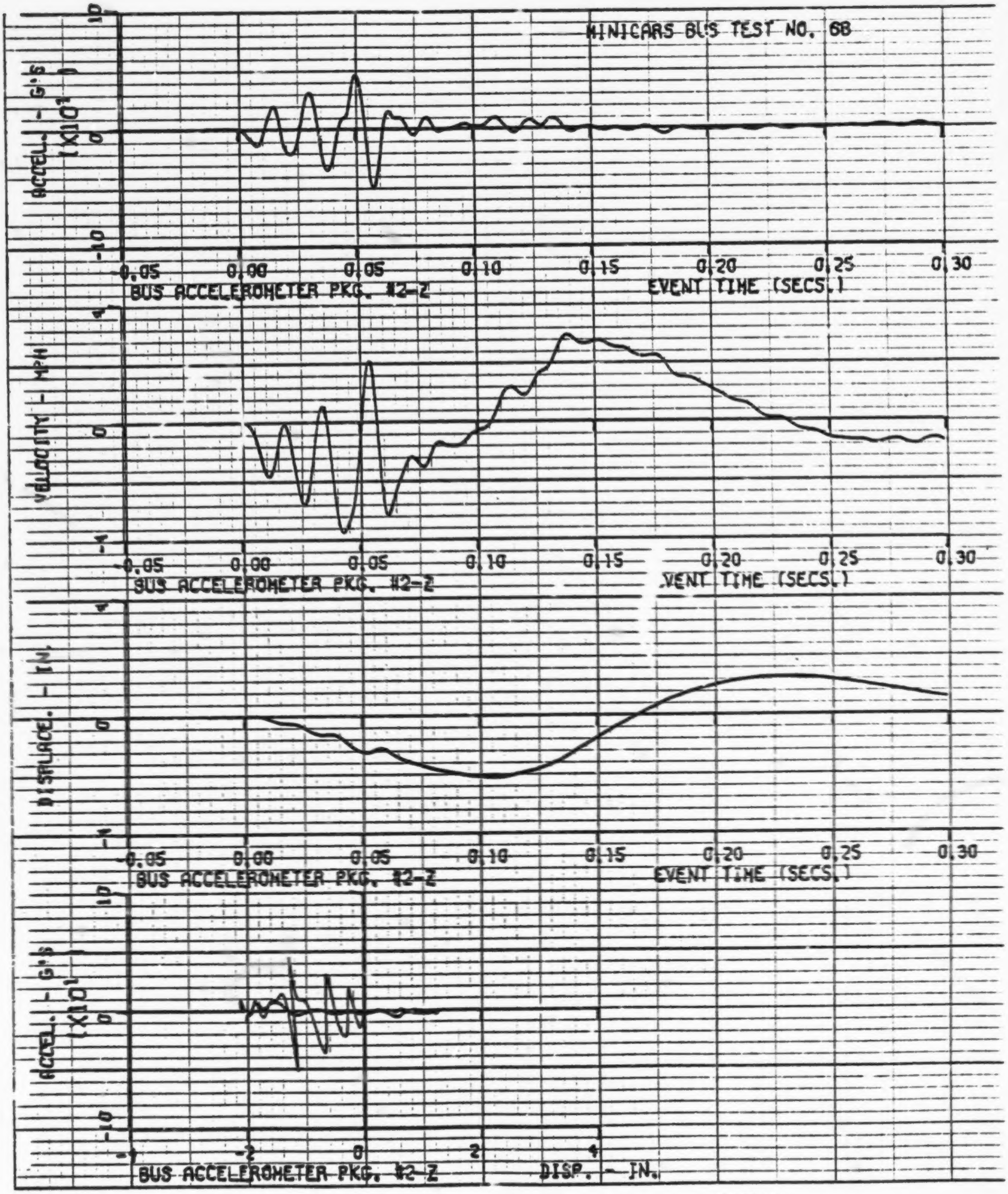
6440-V-4


MINICARS BUS TEST NO. 68
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-Y
EVENT TIME (SECS.)


VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-Y
EVENT TIME (SECS.)

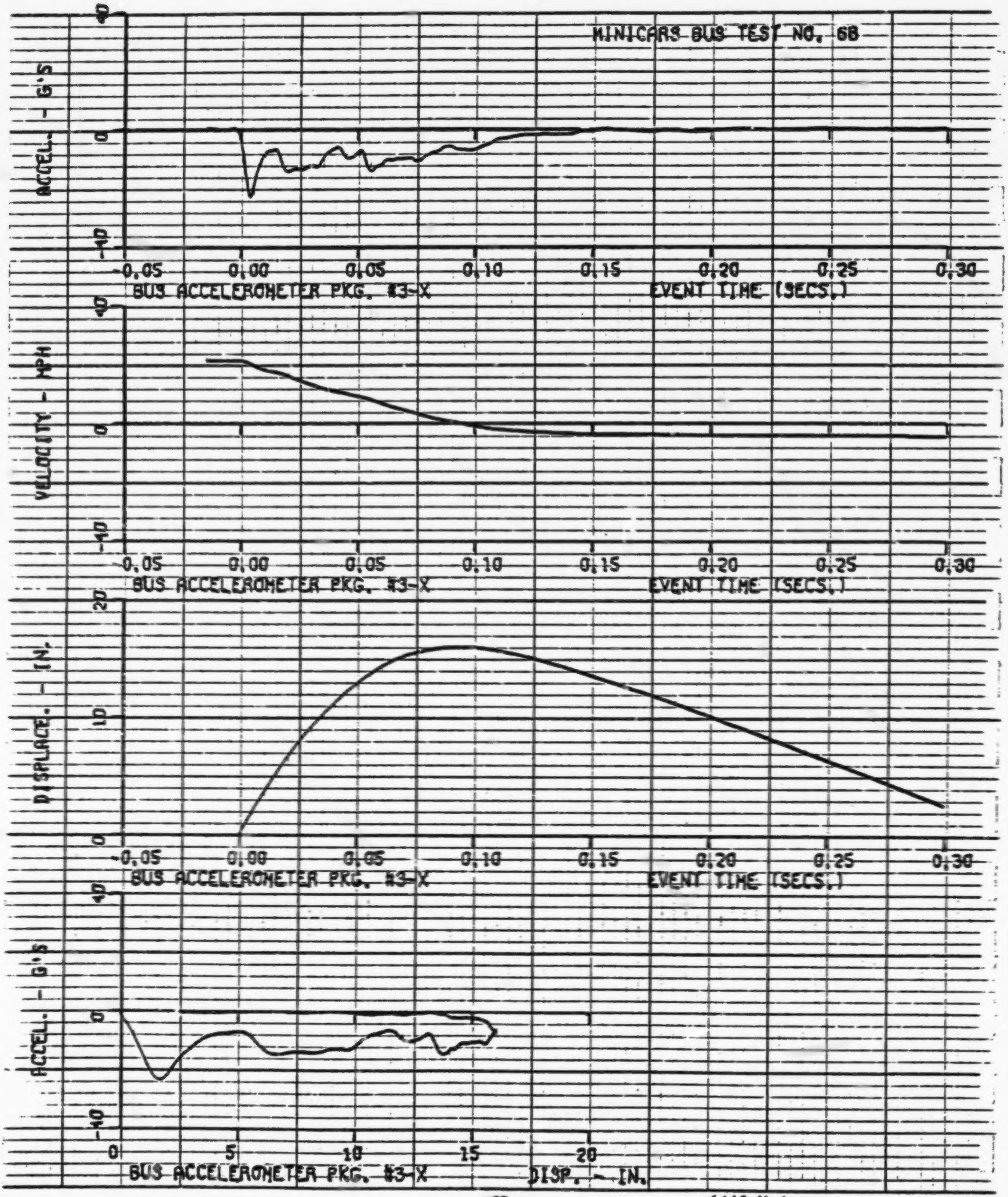

DISPLACE. - IN.
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-Y
EVENT TIME (SECS.)

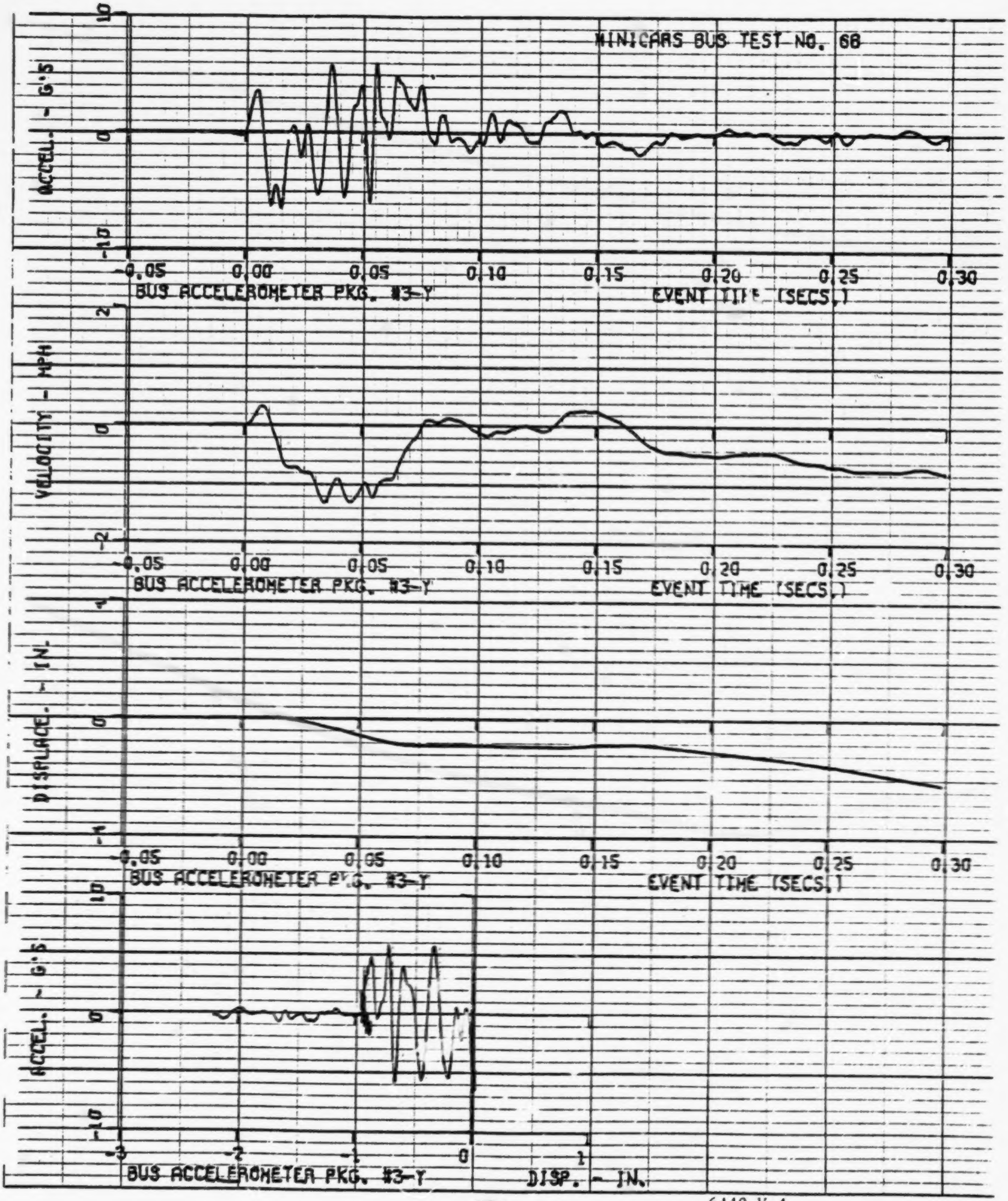

ACCEL. - G'S
10
0
-10
-1
0
1
2
3
BUS ACCELEROMETER PKG. #2-Y
DISP. - IN.

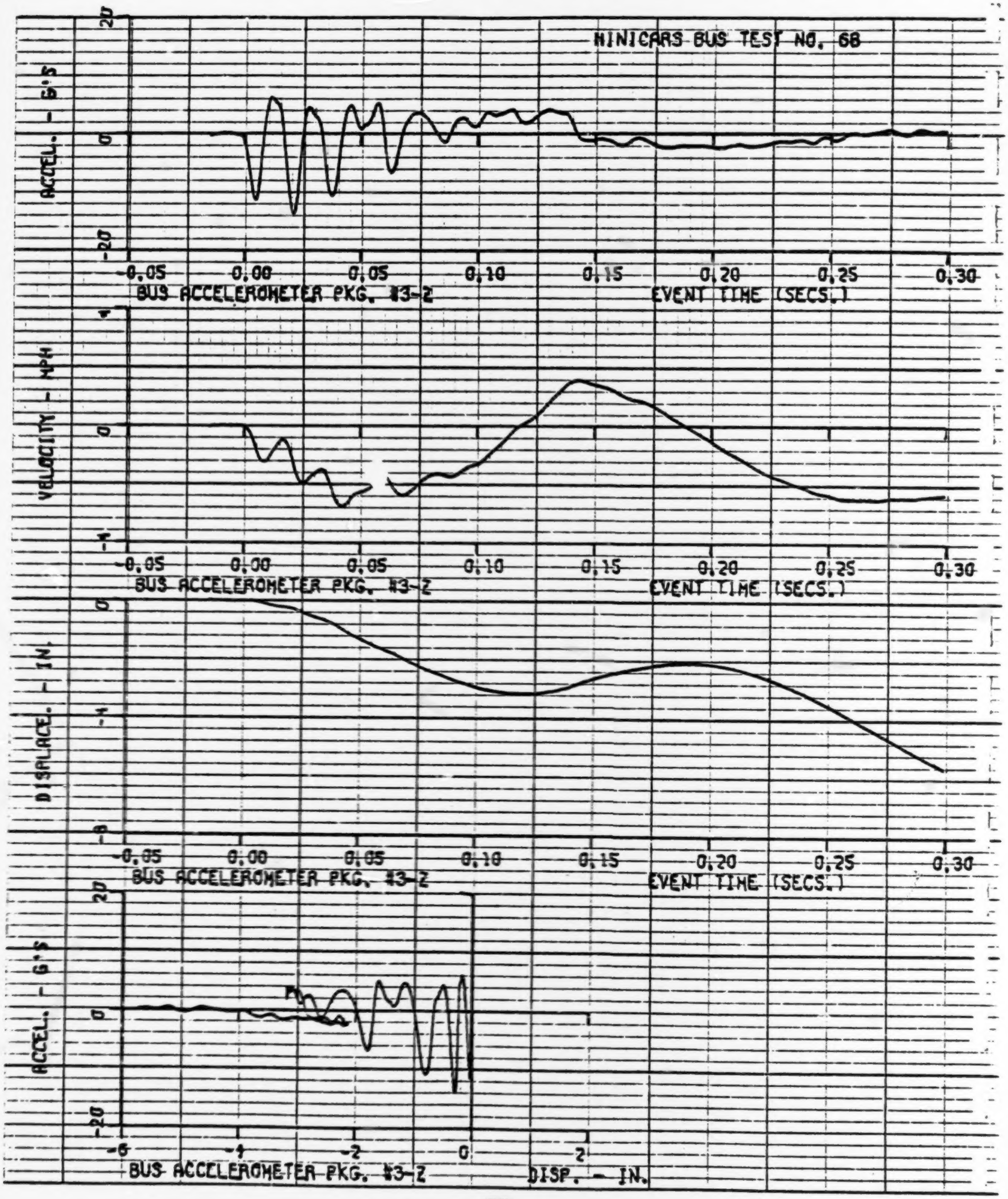

MINICARS BUS TEST NO. 68
ACCEL. - G'S (X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-Z
EVENT TIME (SECS.)
VELOCITY - MPH
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-Z
EVENT TIME (SECS.)
ACCEL. - G'S (X10¹)
10
0
-10
-4
-2
0
2
4
BUS ACCELEROMETER PKG. #2-Z
DISP. - IN.

6440-V-4

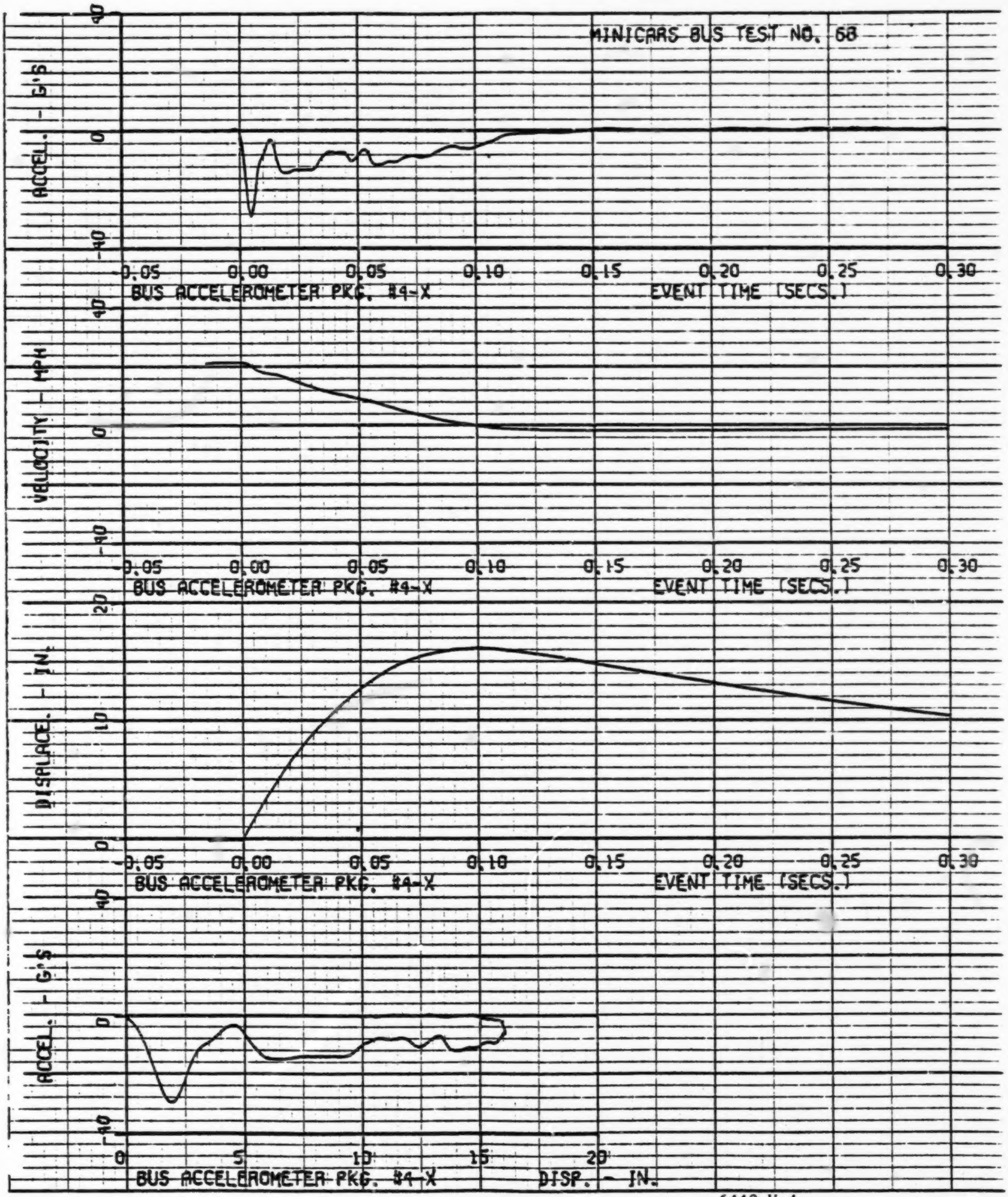
423


MINICARS BUS TEST NO. 6B
ACCEL. - G'S
40
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-X
EVENT TIME (SECS.)
VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-X
EVENT TIME (SECS.)
DISPLACE. - IN.
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-X
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
0
5
10
15
20
BUS ACCELEROMETER PKG. #3-X
DISP. - IN.

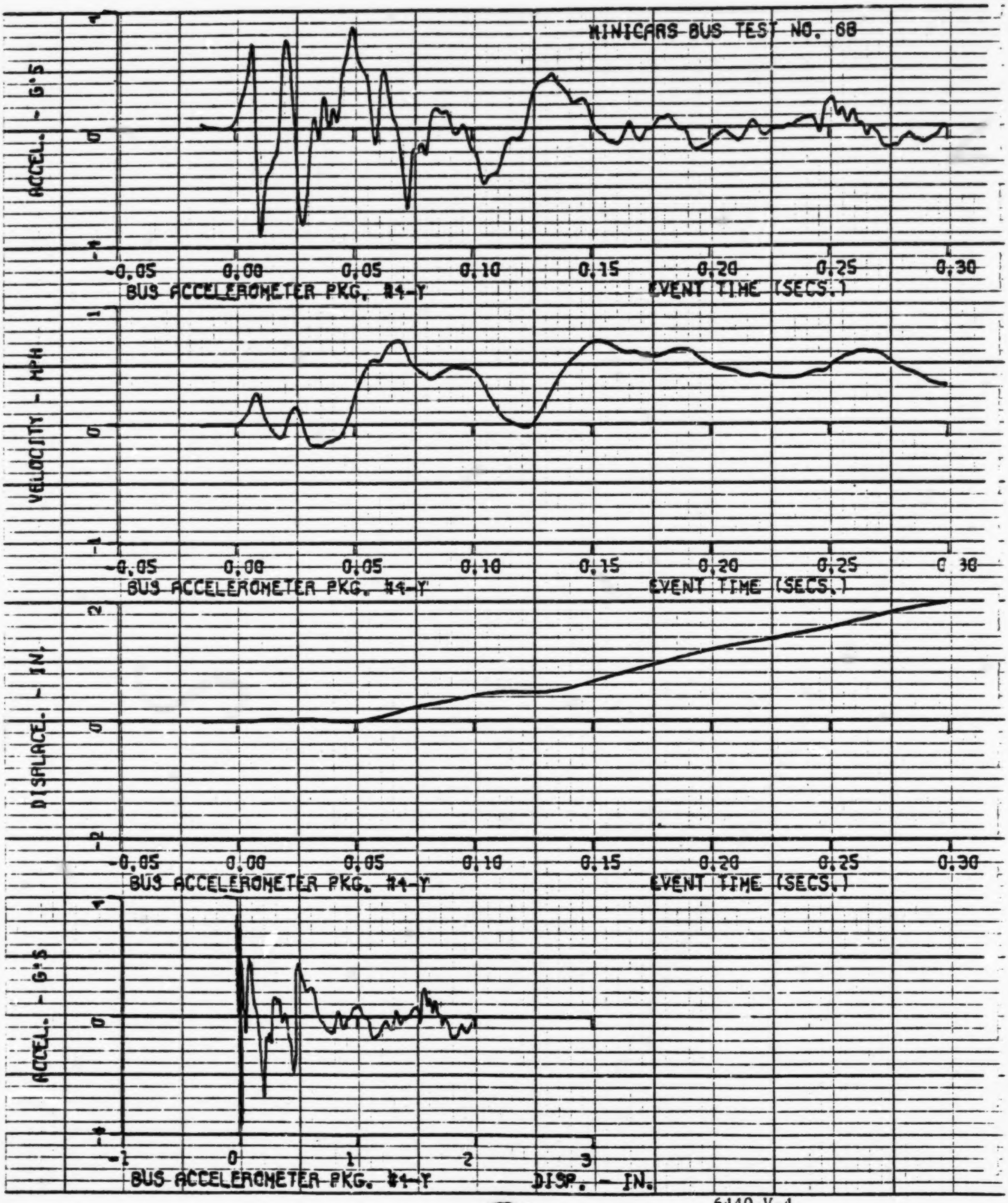

MINICARS BUS TEST NO. 68
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-Y
EVENT TIME (SECS.)
VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-Y
EVENT TIME (SECS.)
DISPLACE. - IN.
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-Y
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-3
-2
-1
0
1
BUS ACCELEROMETER PKG. #3-Y
DISP. - IN.


MINICARS BUS TEST NO. 68
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-Z
EVENT TIME (SECS.)
VELOCITY - MPH
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-4
-8
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-Z
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-6
-4
-2
0
2
BUS ACCELEROMETER PKG. #3-Z
DISP. - IN.

6440-V-4

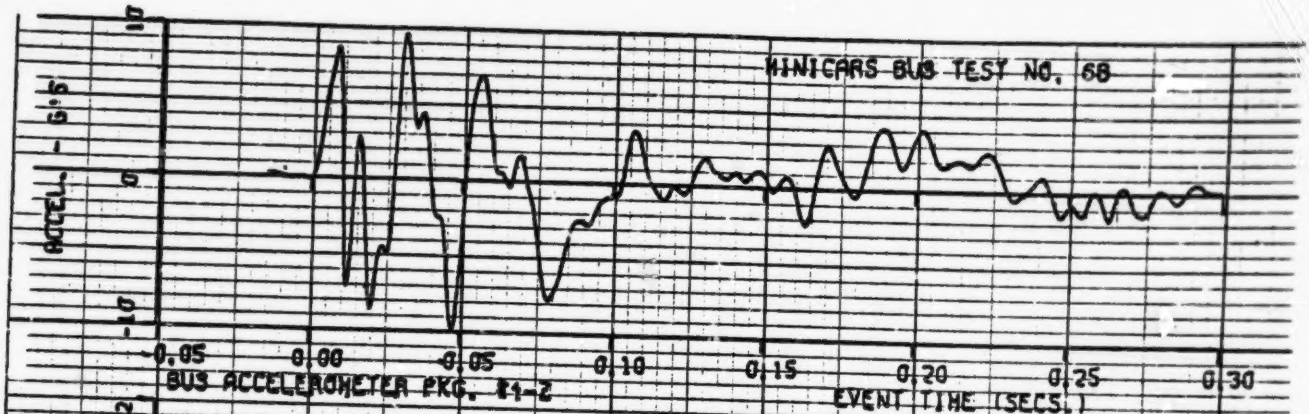

MINICARS BUS TEST NO. 68
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-X
EVENT TIME (SECS.)
VELOCITY - MPH
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-X
EVENT TIME (SECS.)
DISPLACE. - IN.
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-X
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
0
5
10
15
20
BUS ACCELEROMETER PKG. #4-X
DISP. - IN.

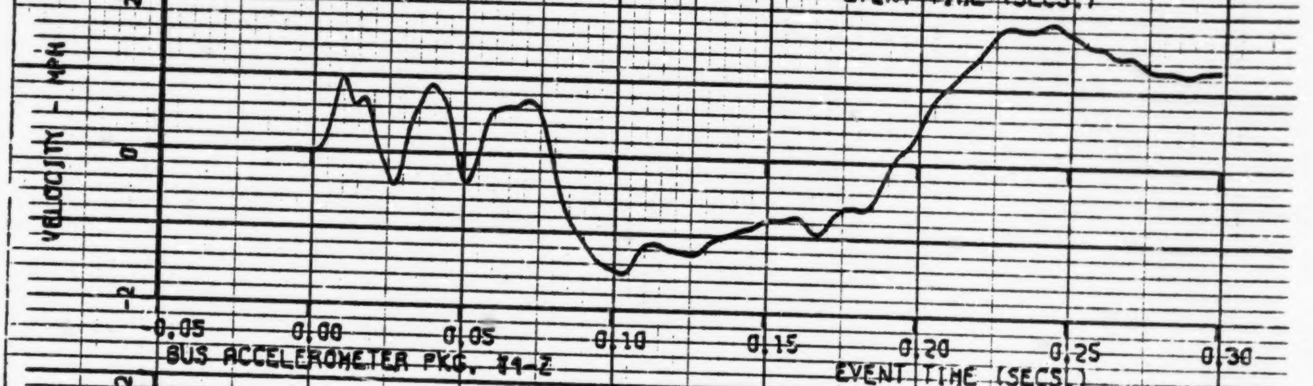
6440-V-4

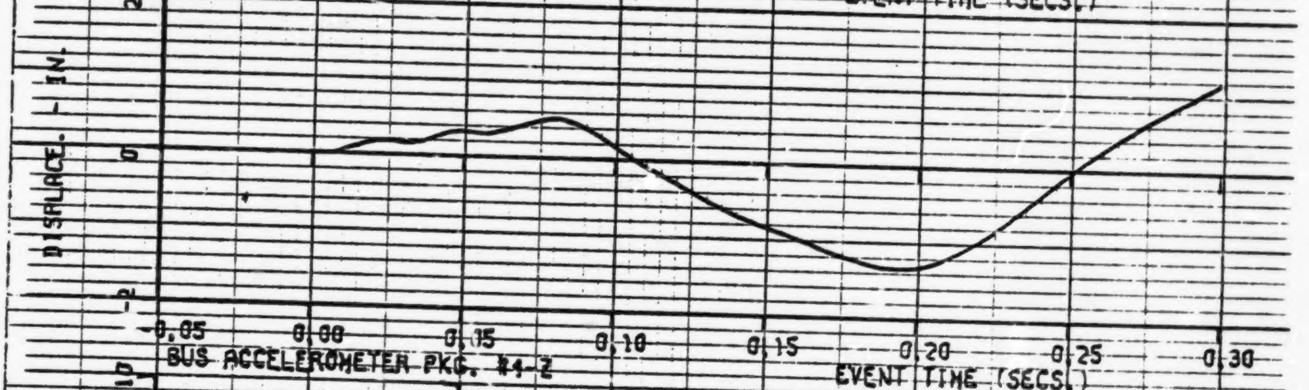

MINICARS BUS TEST NO. 68
ACCEL. - G'S
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-Y
EVENT TIME (SECS.)
VELOCITY - MPH
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-Y
EVENT TIME (SECS.)
DISPLACE. - IN.
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-Y
EVENT TIME (SECS.)
ACCEL. - G'S
1
0
-1
-1
0
1
2
3
BUS ACCELEROMETER PKG. #4-Y
DISP. - IN.

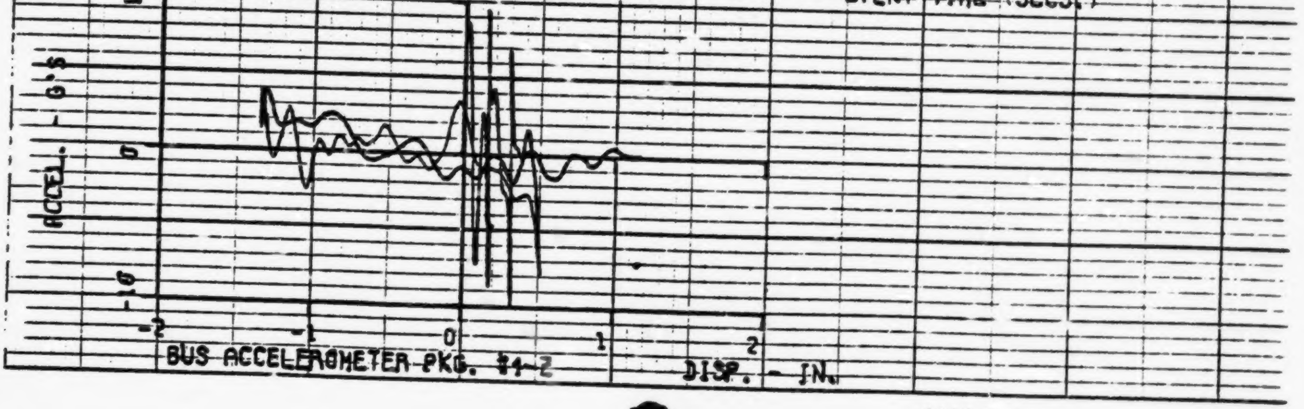
6440-V-4

428

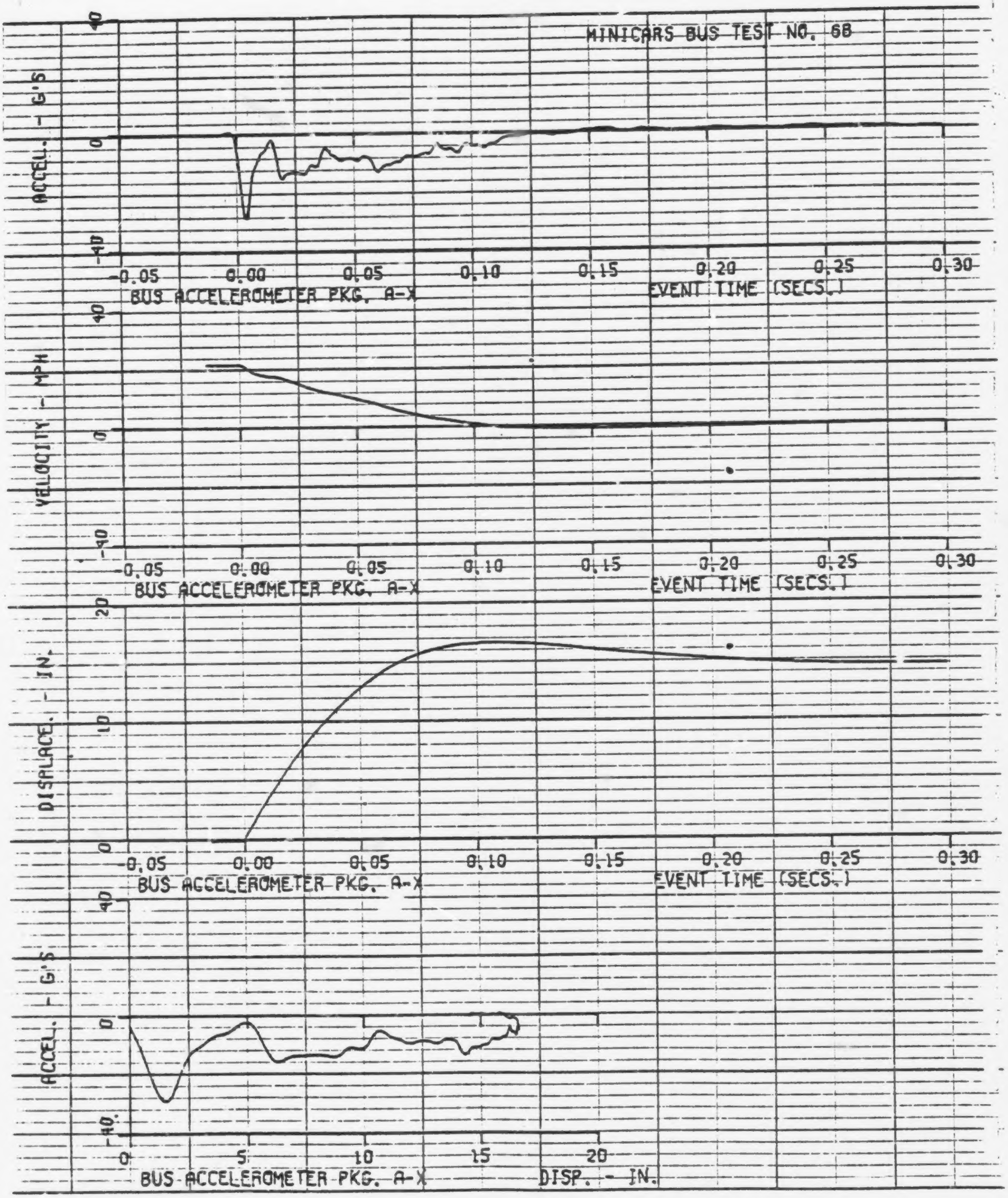

MINICARS BUS TEST NO. 68
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Z
EVENT TIME (SECS.)


VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Z
EVENT TIME (SECS.)


DISPLACE. - IN.
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Z
EVENT TIME (SECS.)

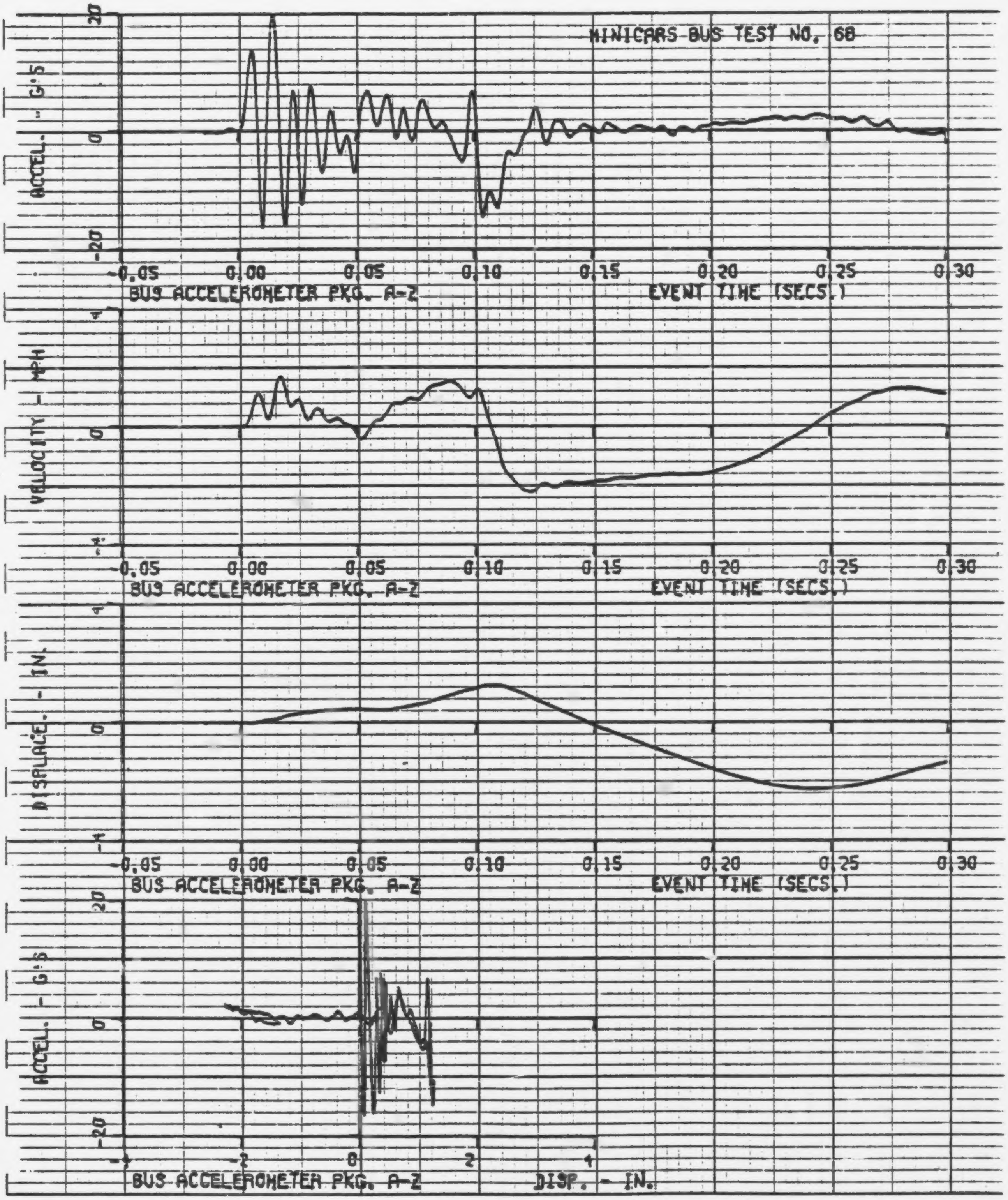

ACCEL. - G'S
10
0
-10
-2
-1
0
1
2
BUS ACCELEROMETER PKG. #1-Z
DISP. - IN.

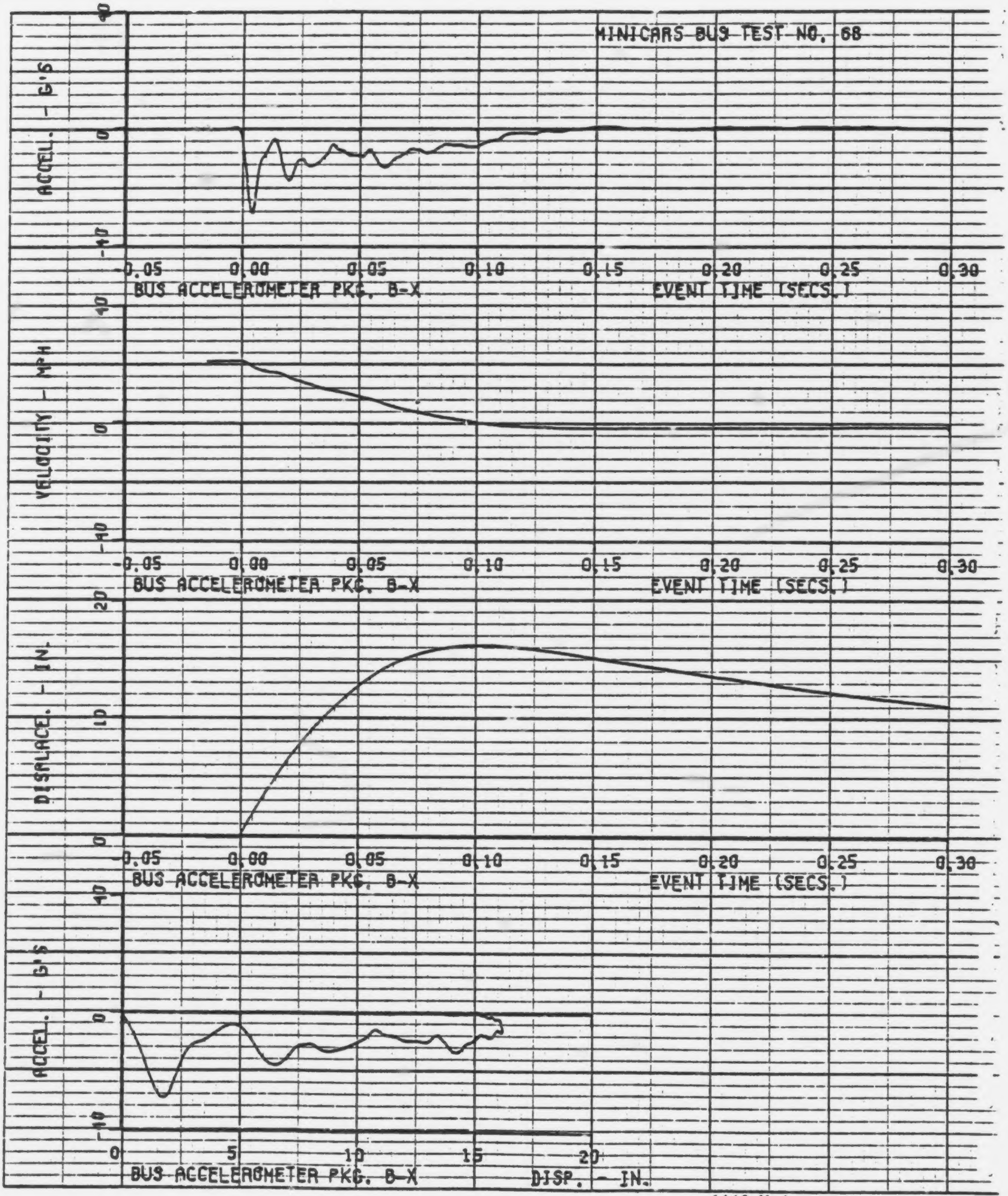
6440-V-4


MINICARS BUS TEST NO. 68
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-X
EVENT TIME (SECS.)
VELOCITY - MPH
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-X
EVENT TIME (SECS.)
DISPLACE. - IN.
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-X
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
0
5
10
15
20
BUS ACCELEROMETER PKG. A-X
DISP. - IN.

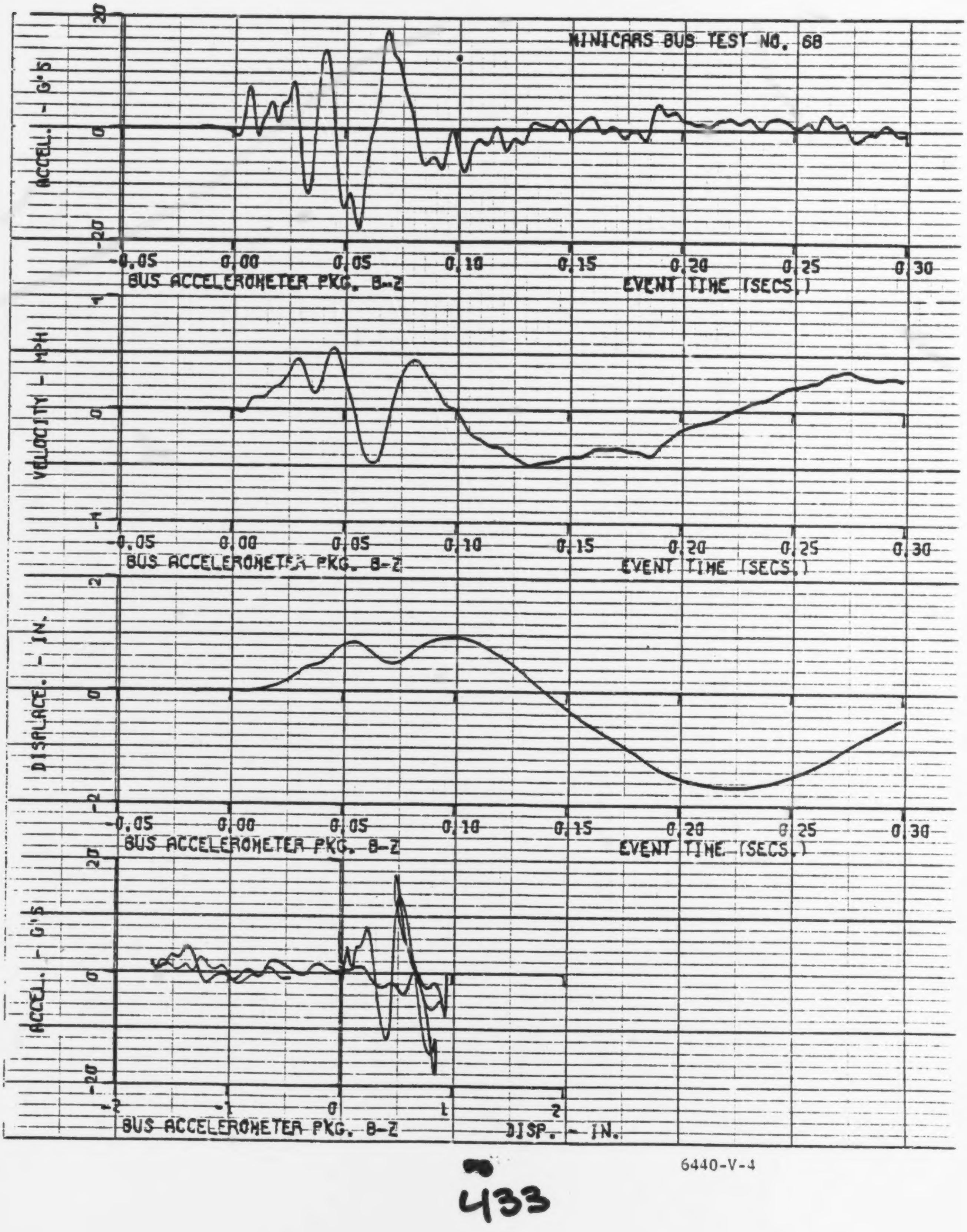
6440-V-4

430

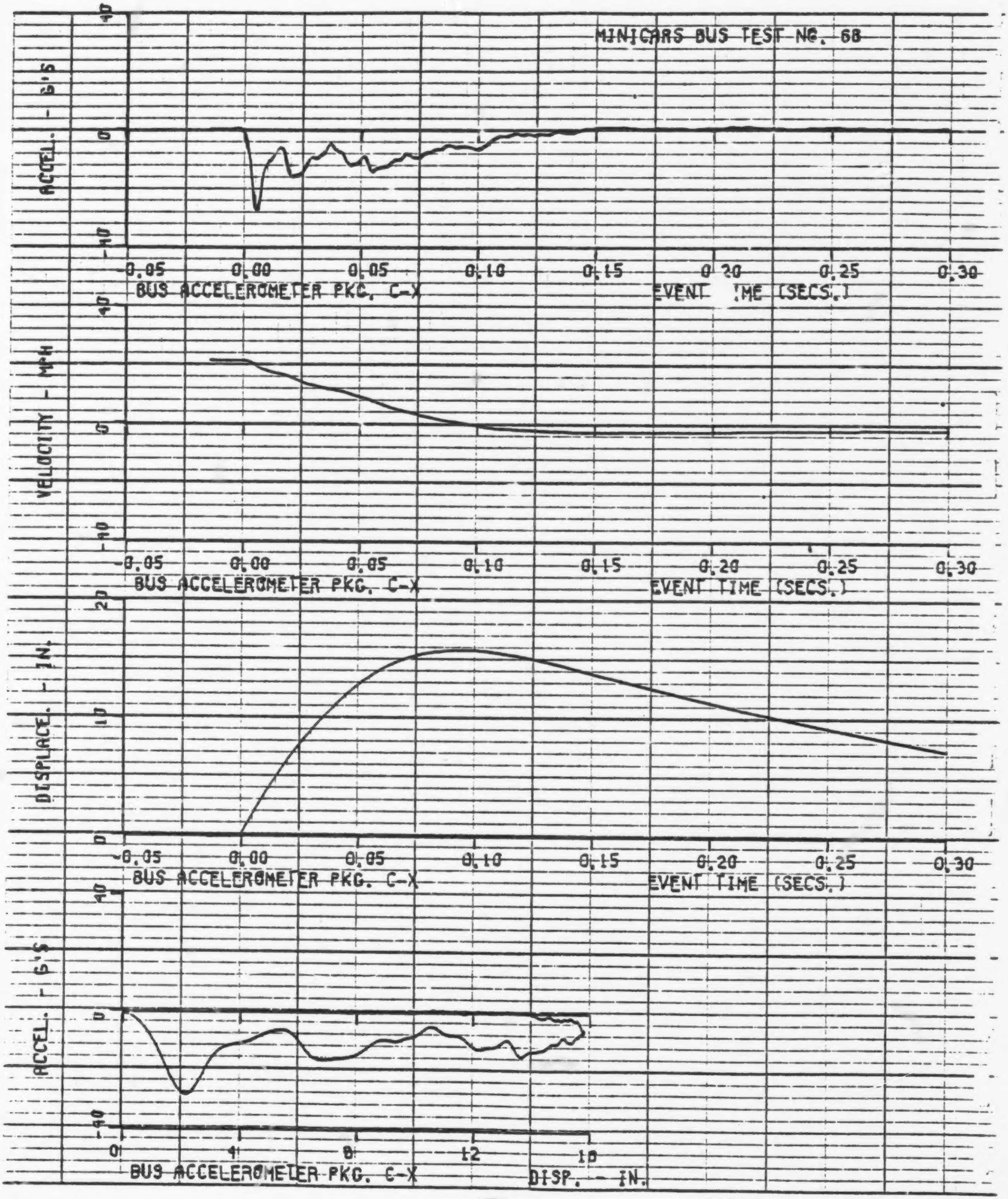

MINICARS BUS TEST NO. 68
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-Z
EVENT TIME (SECS.)
VELOCITY - MPH
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-Z
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-4
-2
0
2
4
BUS ACCELEROMETER PKG. A-Z
DISP. - IN.


MINICARS BUS TEST NO. 68
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. B-X
EVENT TIME (SECS.)
VELOCITY - MPH
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. B-X
EVENT TIME (SECS.)
DISPLACE. - IN.
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. B-X
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
0
5
10
15
20
BUS ACCELEROMETER PKG. B-X
DISP. - IN.

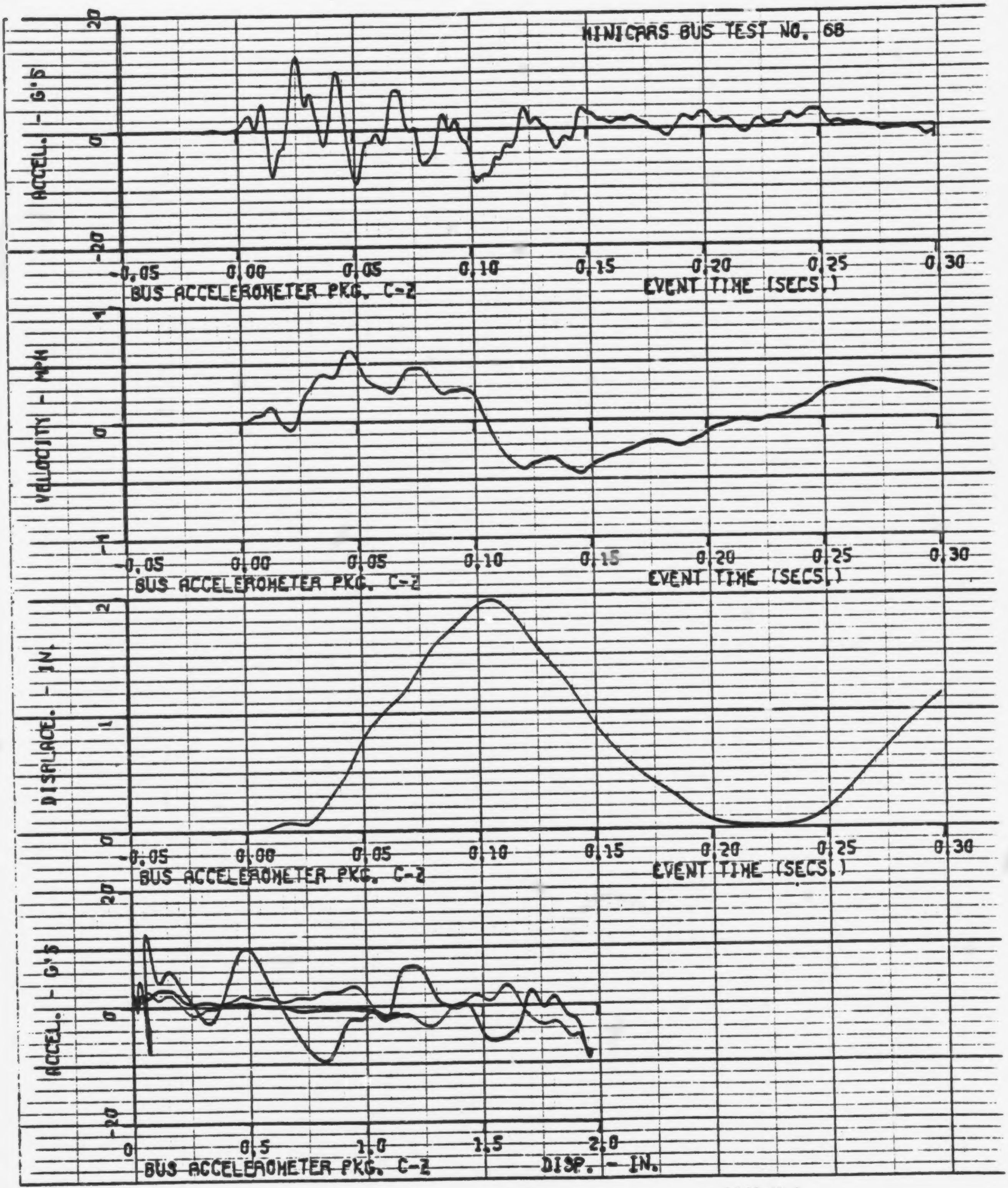
6440-V-4


MINICARS BUS TEST NO. 68
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. B-Z
EVENT TIME (SECS.)
VELOCITY - MPH
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. B-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. B-Z
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-2
-1
0
1
2
BUS ACCELEROMETER PKG. B-Z
DISP. - IN.

6440-V-4

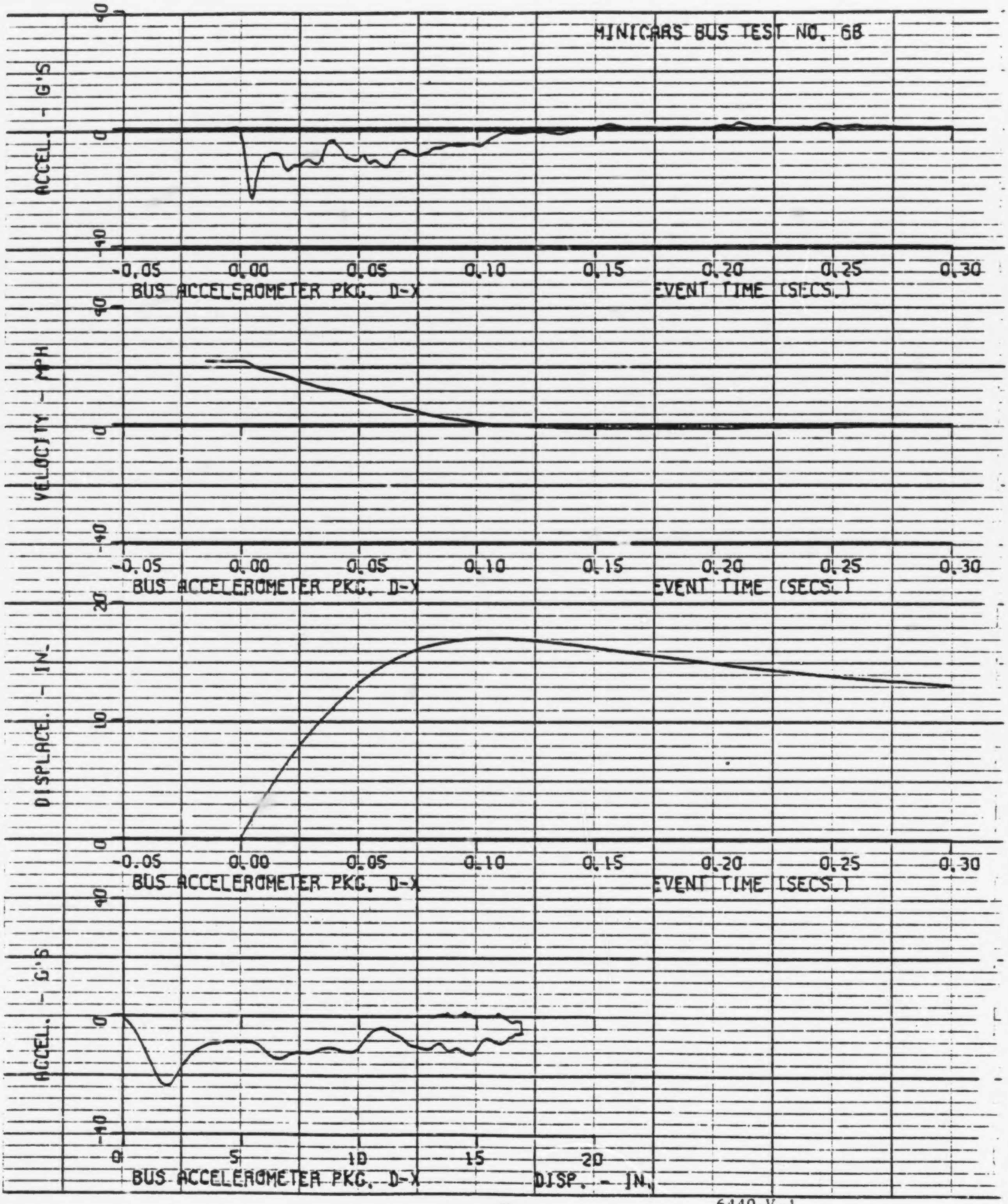

MINICARS BUS TEST NO. 68
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-X
EVENT TIME (SECS.)
VELOCITY - MPH
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-X
EVENT TIME (SECS.)
DISPLACE. - IN.
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-X
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
0
4
8
12
16
BUS ACCELEROMETER PKG. C-X
DISP. - IN.

6440-V-4


MINICARS BUS TEST NO. 68
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-2
EVENT TIME (SECS.)
VELOCITY - MPH
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-2
EVENT TIME (SECS.)
DISPLACE. - IN.
2
1
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-2
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
0
0.5
1.0
1.5
2.0
BUS ACCELEROMETER PKG. C-2
DISP. - IN.

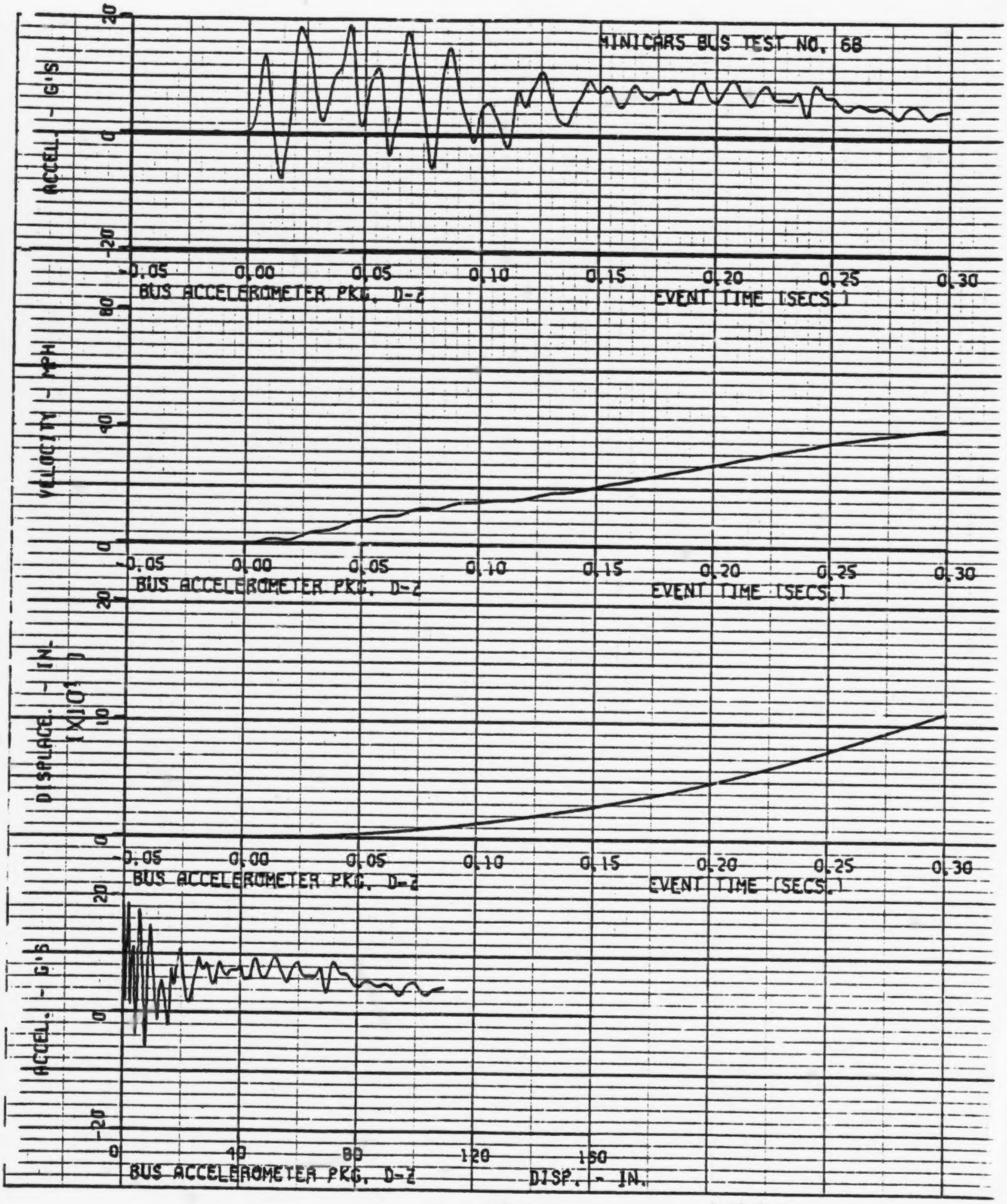
6440-V-4

435


MINICARS BUS TEST NO. 6B
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. D-X
EVENT TIME (SECS.)
VELOCITY - MPH
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. D-X
EVENT TIME (SECS.)
DISPLACE. - IN.
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. D-X
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
0
5
10
15
20
BUS ACCELEROMETER PKG. D-X
DISP. - IN.

6440-V-4

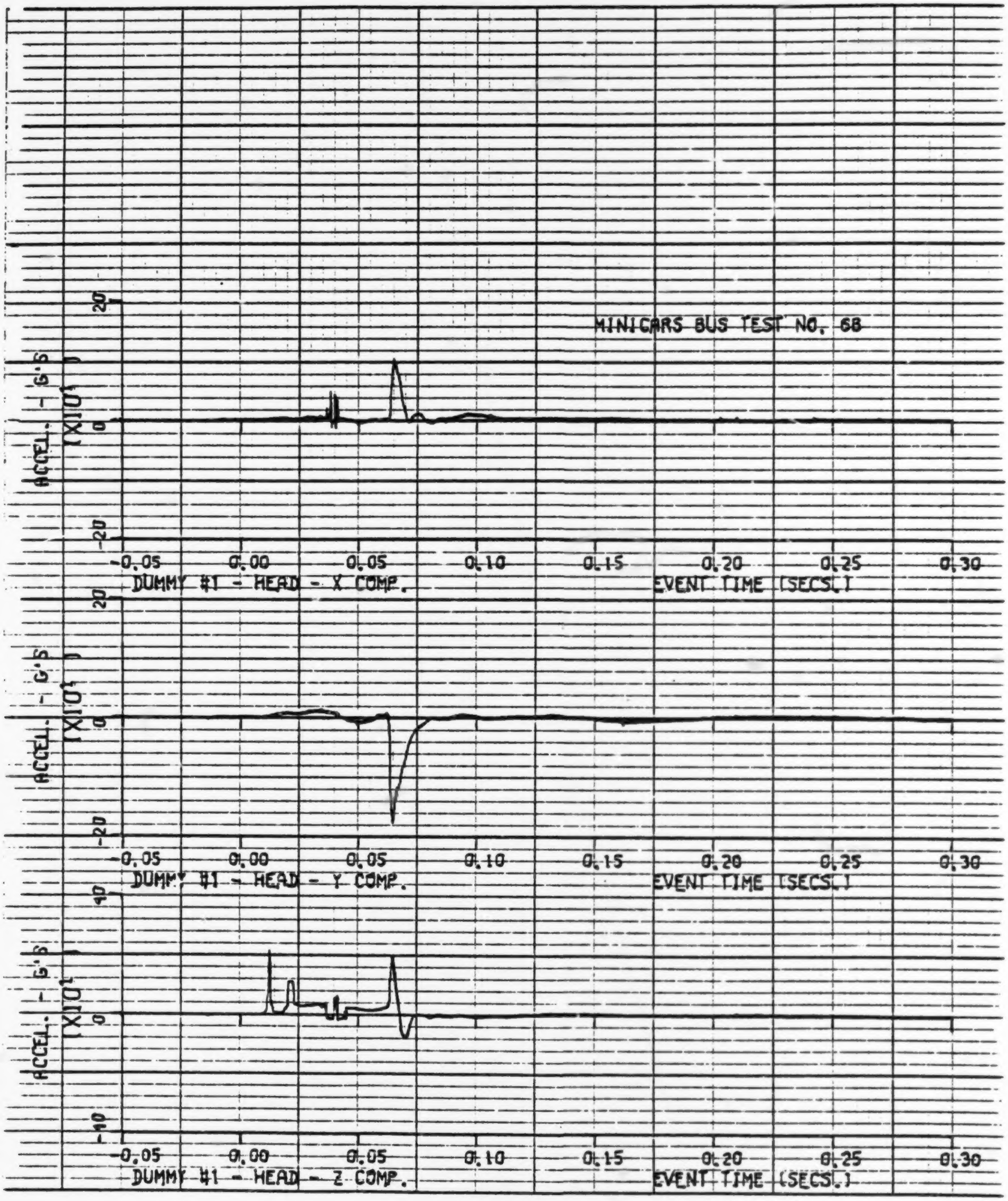
436


MINICARS BUS TEST NO. 6B
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. D-Z
EVENT TIME (SECS.)
VELOCITY - MPH
80
40
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. D-Z
EVENT TIME (SECS.)
DISPLACE. - IN.
(X10¹)
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. D-Z
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
0
40
80
120
160
BUS ACCELEROMETER PKG. D-Z
DISP. - IN.

6440-V-4

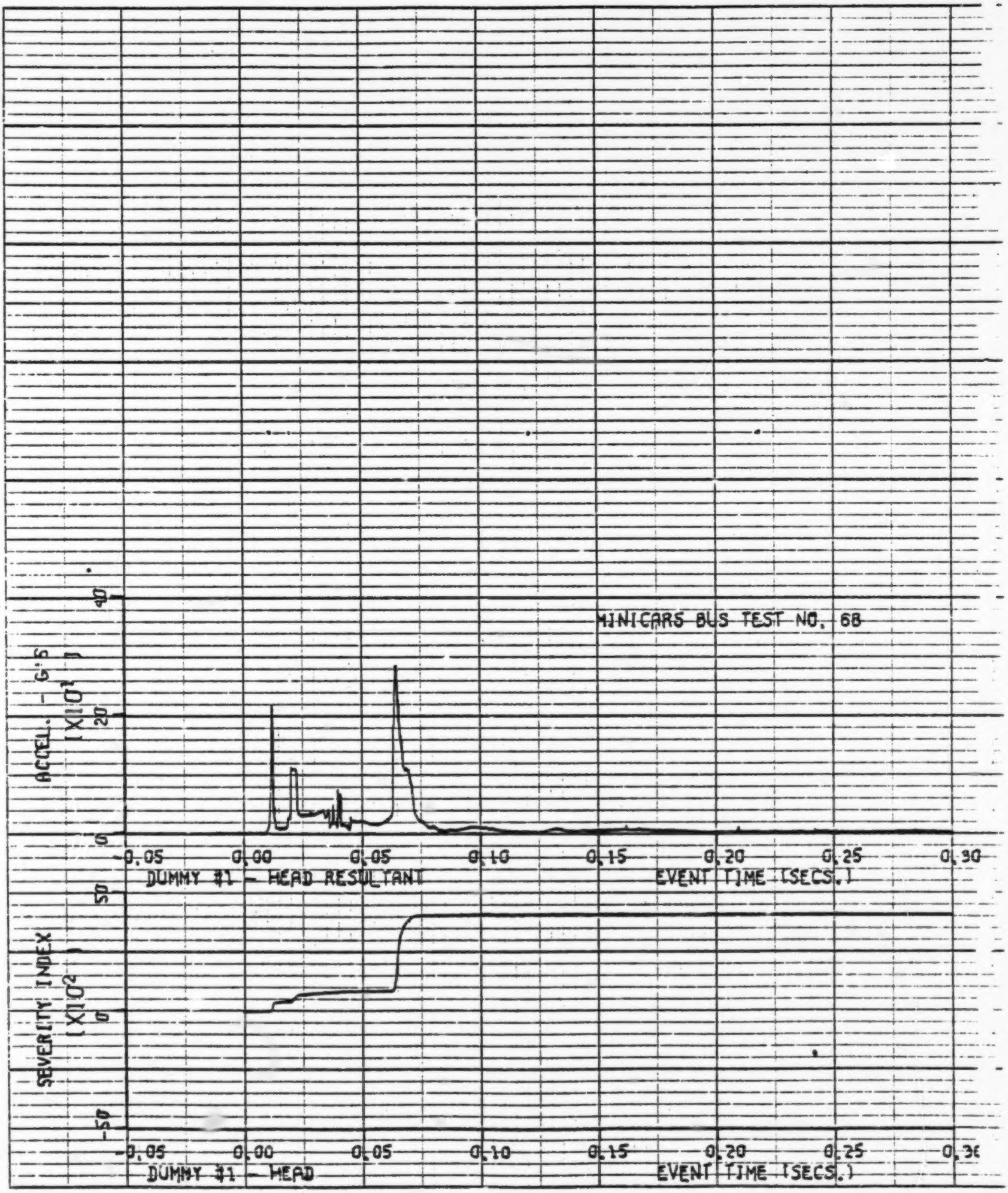
BLANK PAGE

DUMMY DATA

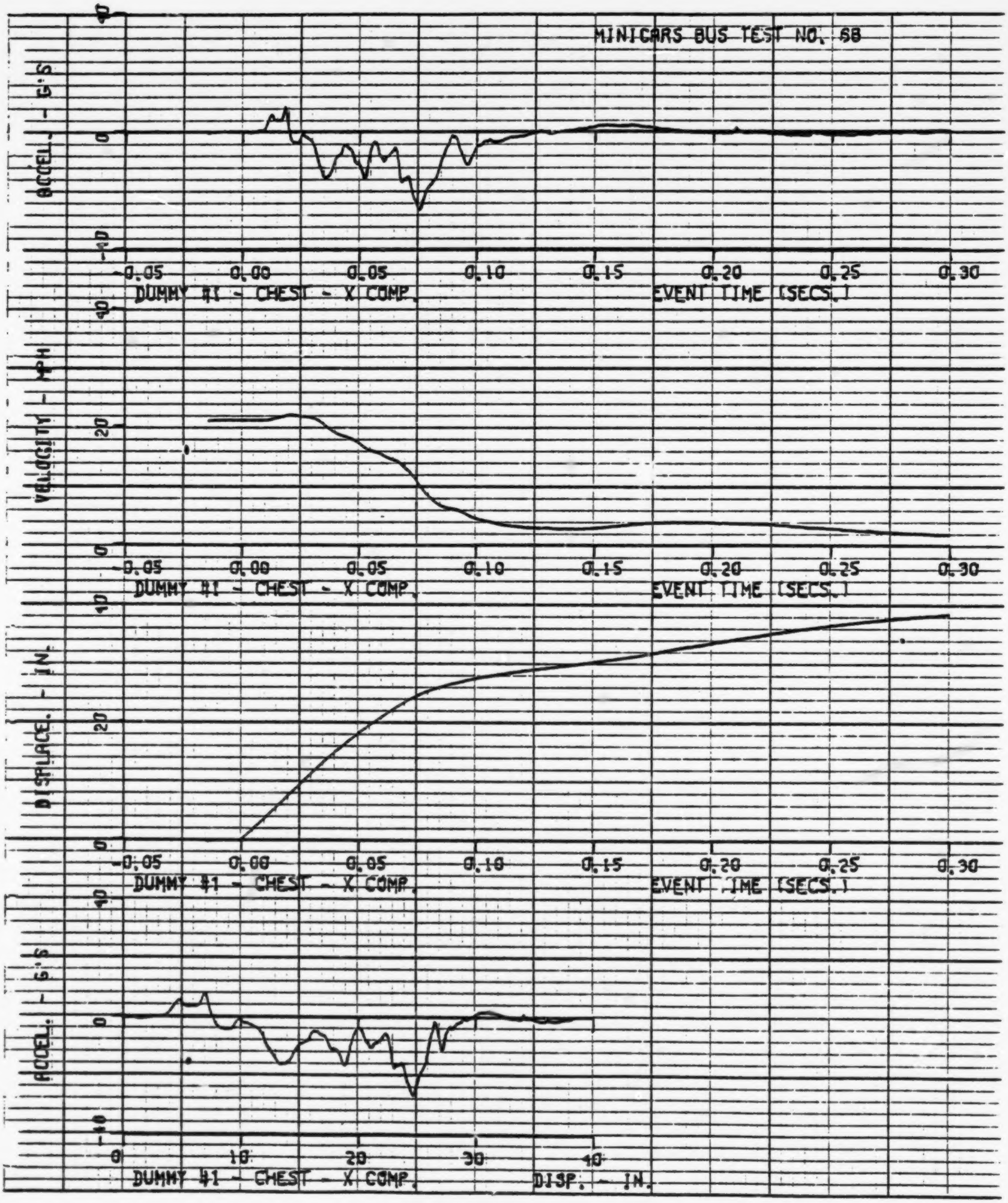

MINICARS BUS TEST NO. 68
ACCEL. - G'S (X10¹)
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - HEAD - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S (X10¹)
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - HEAD - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S (X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - HEAD - Z COMP.
EVENT TIME (SECS.)

6440-V-4

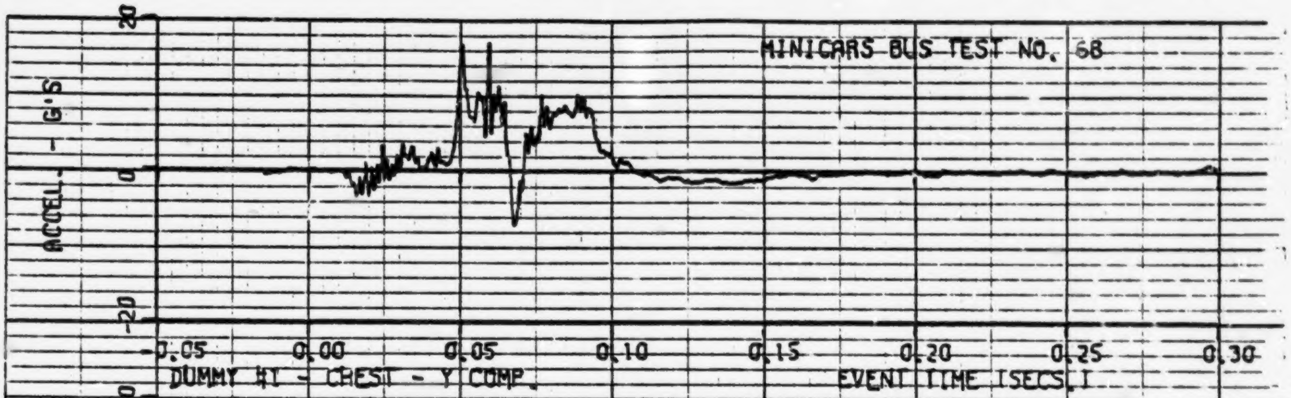
440

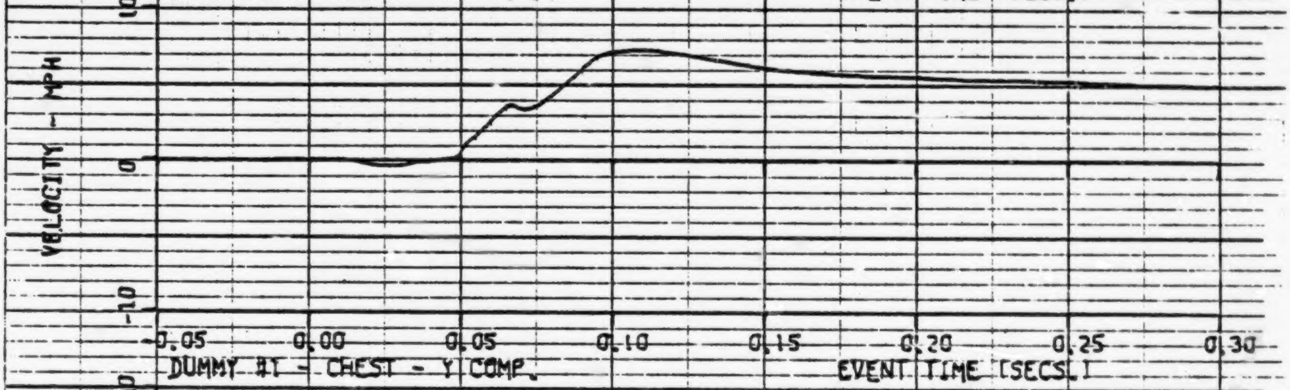

MINICARS BUS TEST NO. 68
ACCEL. - G'S (X10¹)
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX (X10²)
50
0
-50
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - HEAD
EVENT TIME (SECS.)

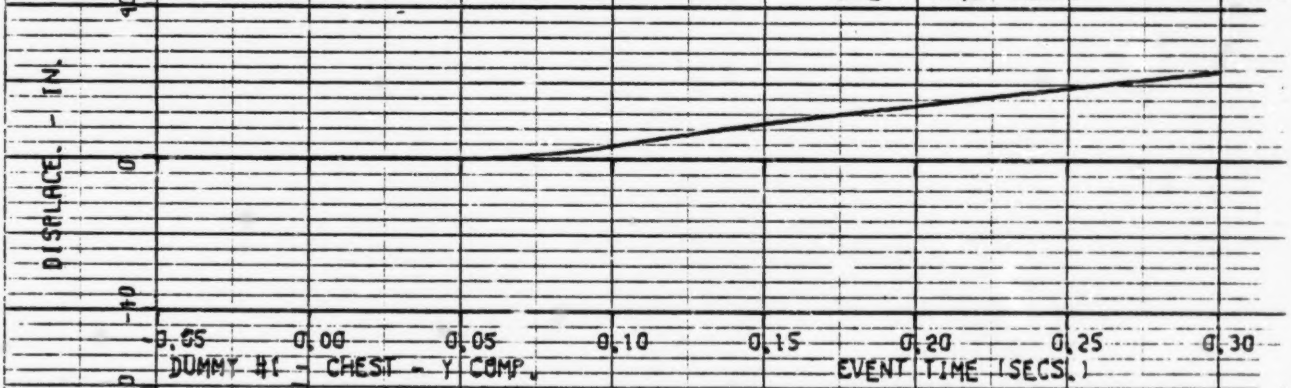
6440-V-4

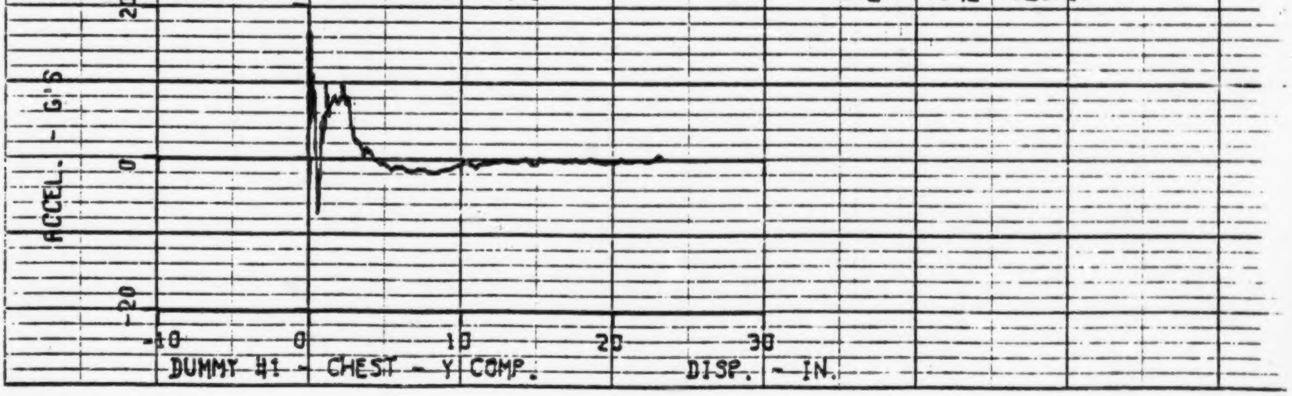

MINICARS BUS TEST NO. 68
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST - X COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST - X COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
0
10
20
30
40
DUMMY #1 - CHEST - X COMP.
DISP. - IN.

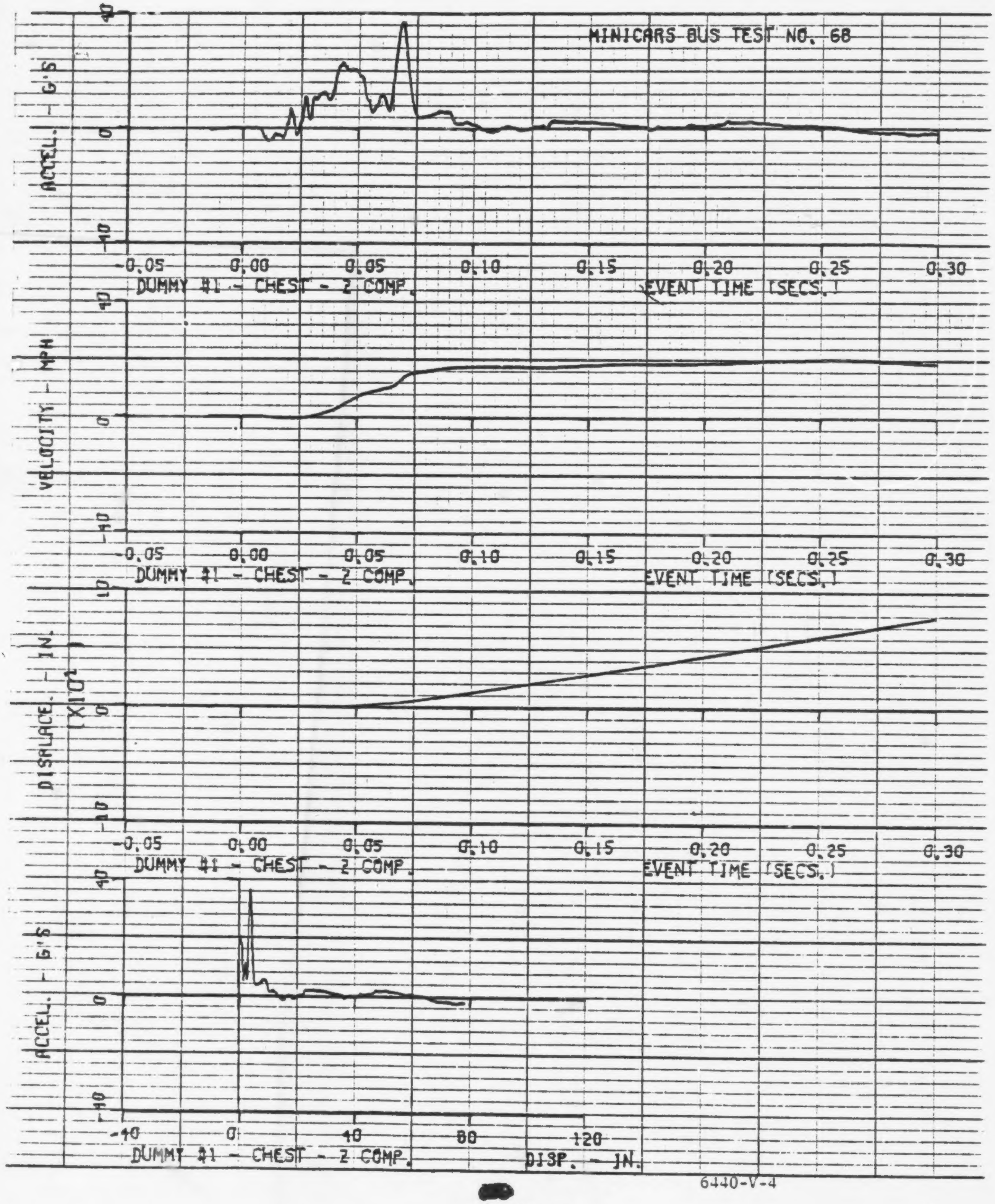
6440-V-4


MINICARS BUS TEST NO. 68
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST - Y COMP.
EVENT TIME (SECS.)


VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST - Y COMP.
EVENT TIME (SECS.)

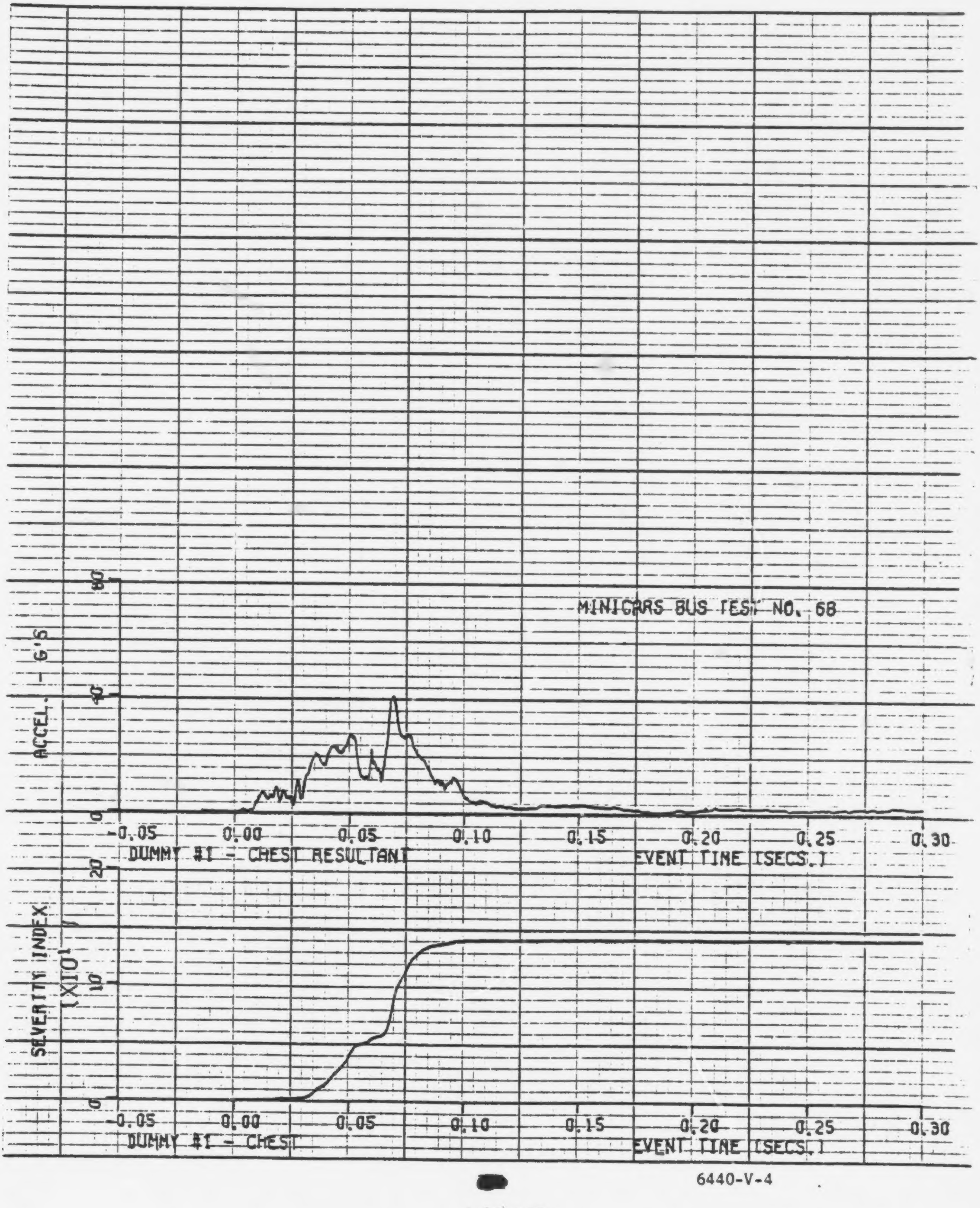

DISPLACE. - IN.
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST - Y COMP.
EVENT TIME (SECS.)


ACCEL. - G'S
20
0
-20
-10
0
10
20
30
DUMMY #1 - CHEST - Y COMP.
DISP. - IN.

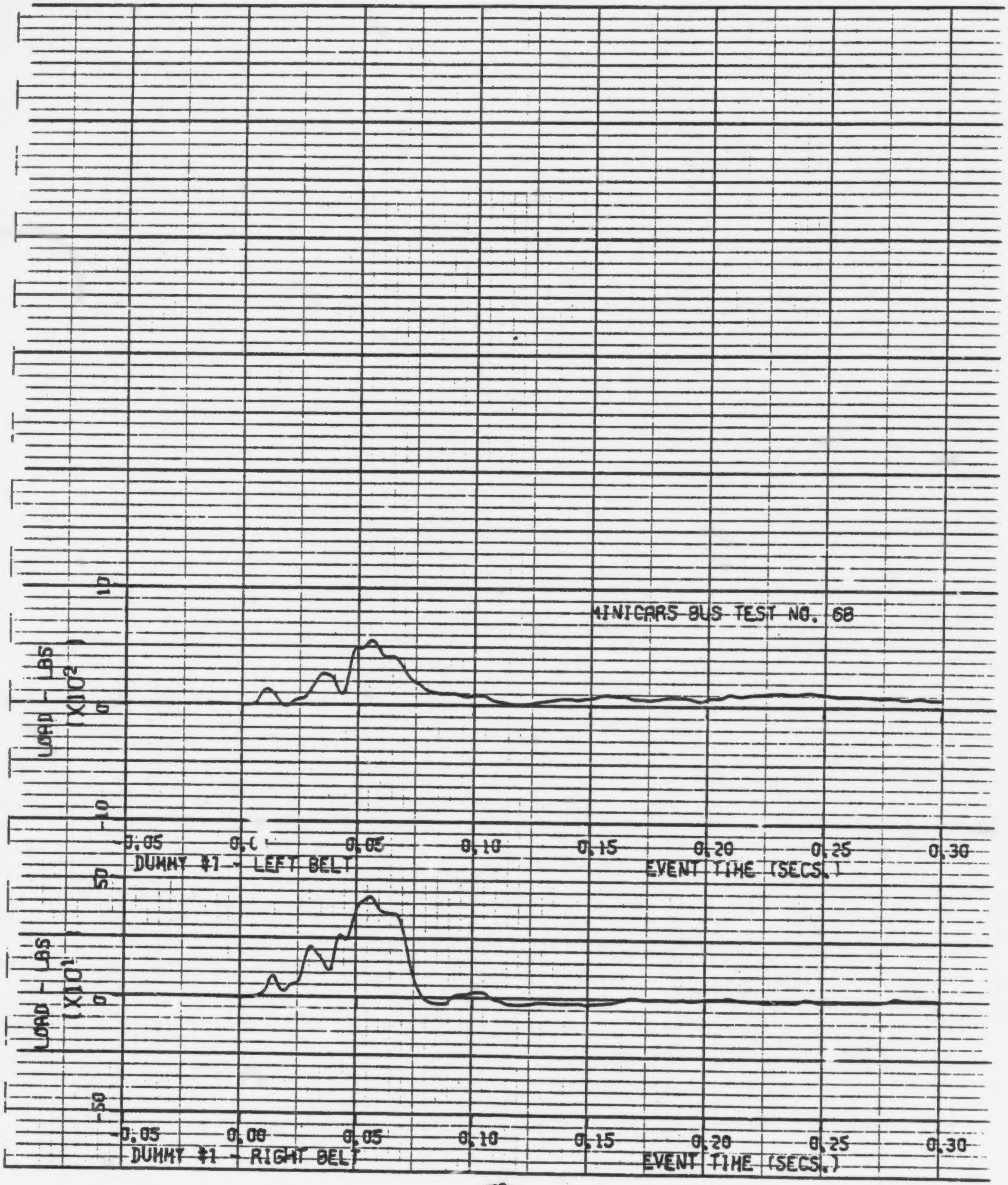

MINICARS BUS TEST NO. 68
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST - Z COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST - Z COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
(X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST - Z COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
-40
0
40
80
120
DUMMY #1 - CHEST - Z COMP.
DISP. - IN.

6440-V-4

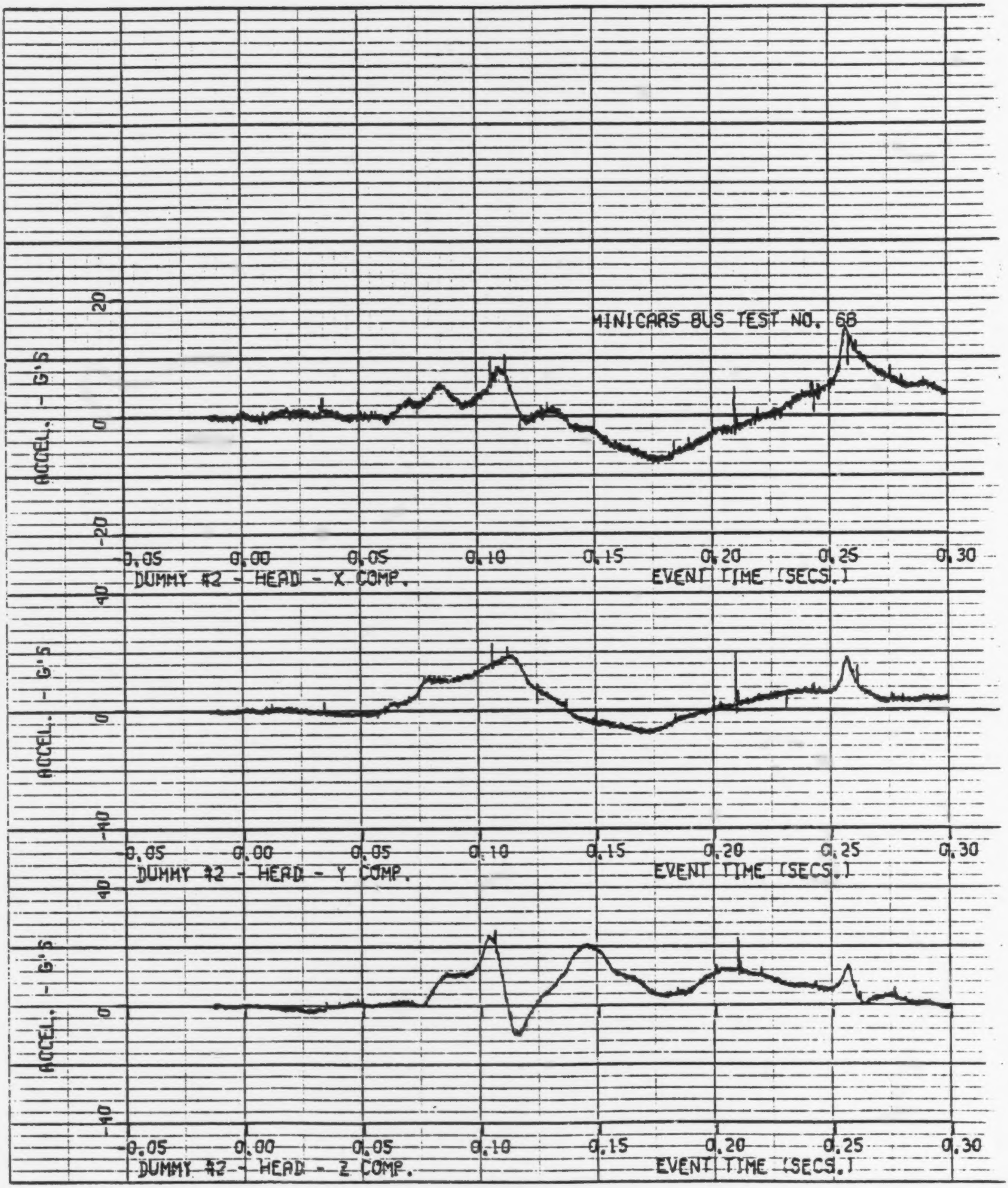
444

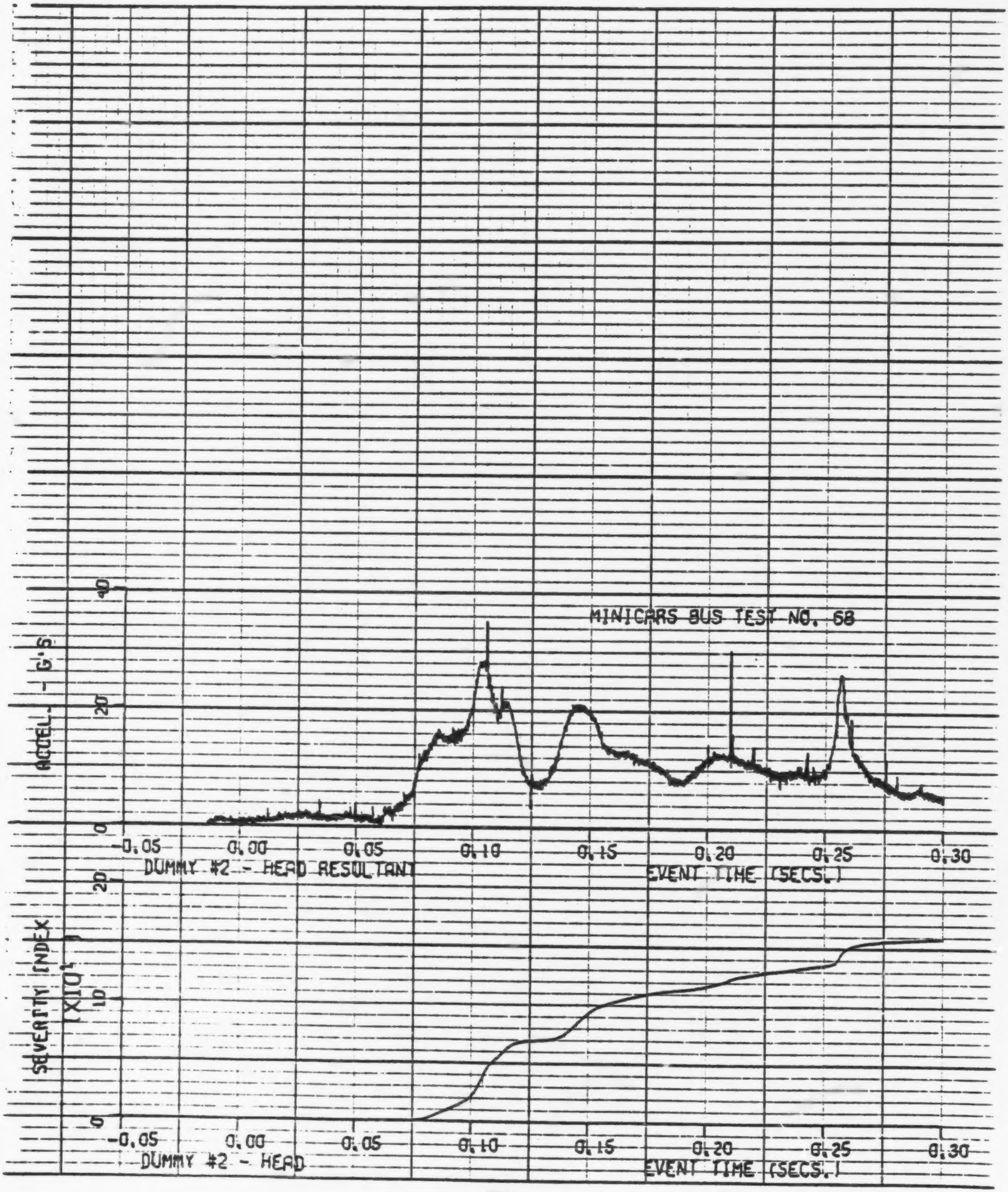

MINICARS BUS TEST NO. 68
ACCEL. - G'S
80
40
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST RESULTANT
EVENT TIME [SECS.]
SEVERITY INDEX
[X10¹]
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - CHEST
EVENT TIME [SECS.]

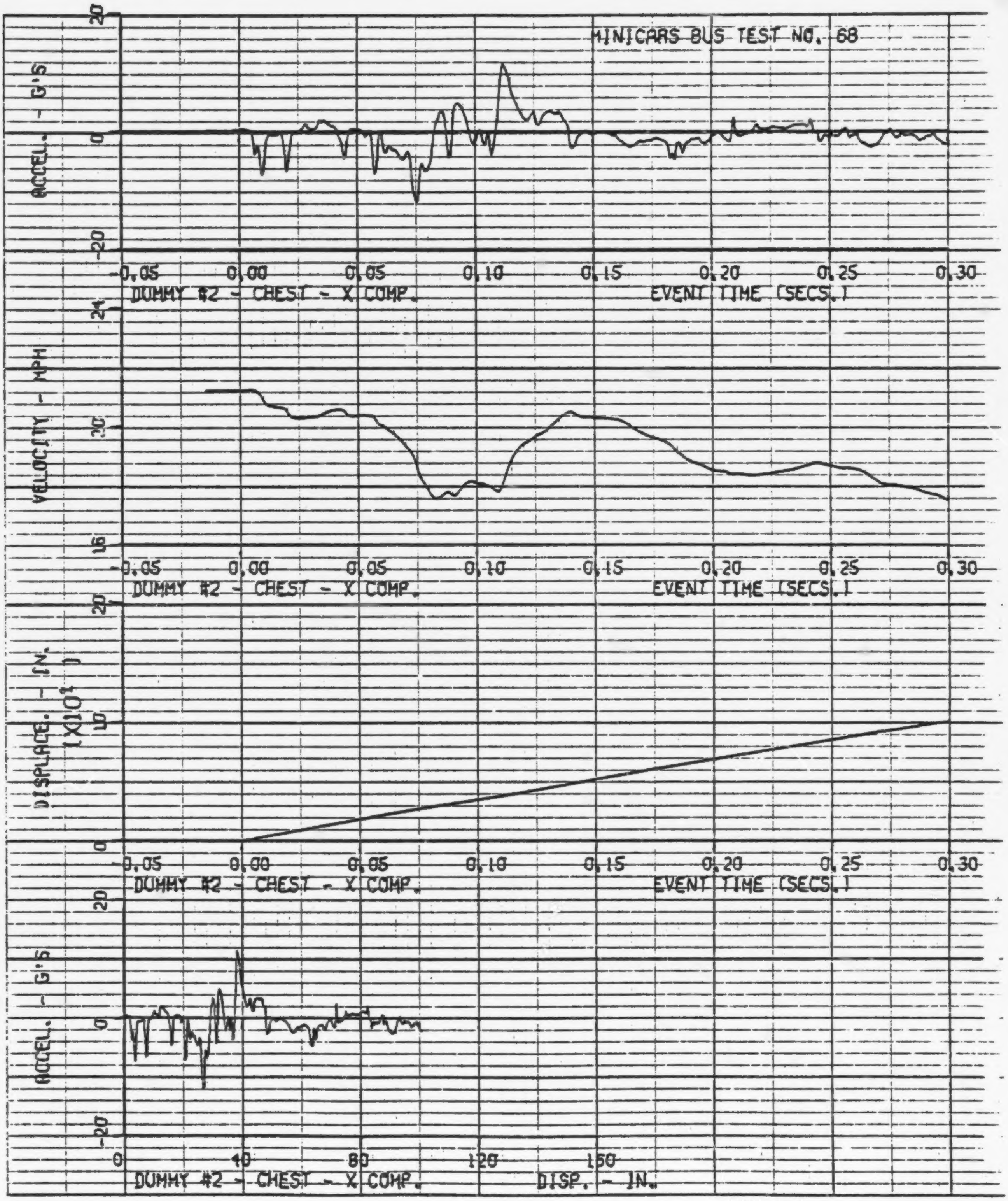
6440-V-4


MINICARS BUS TEST NO. 6B
LOAD - LBS
(X10^2)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - LEFT BELT
EVENT TIME (SECS.)
LOAD - LBS
(X10^1)
50
0
-50
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #1 - RIGHT BELT
EVENT TIME (SECS.)

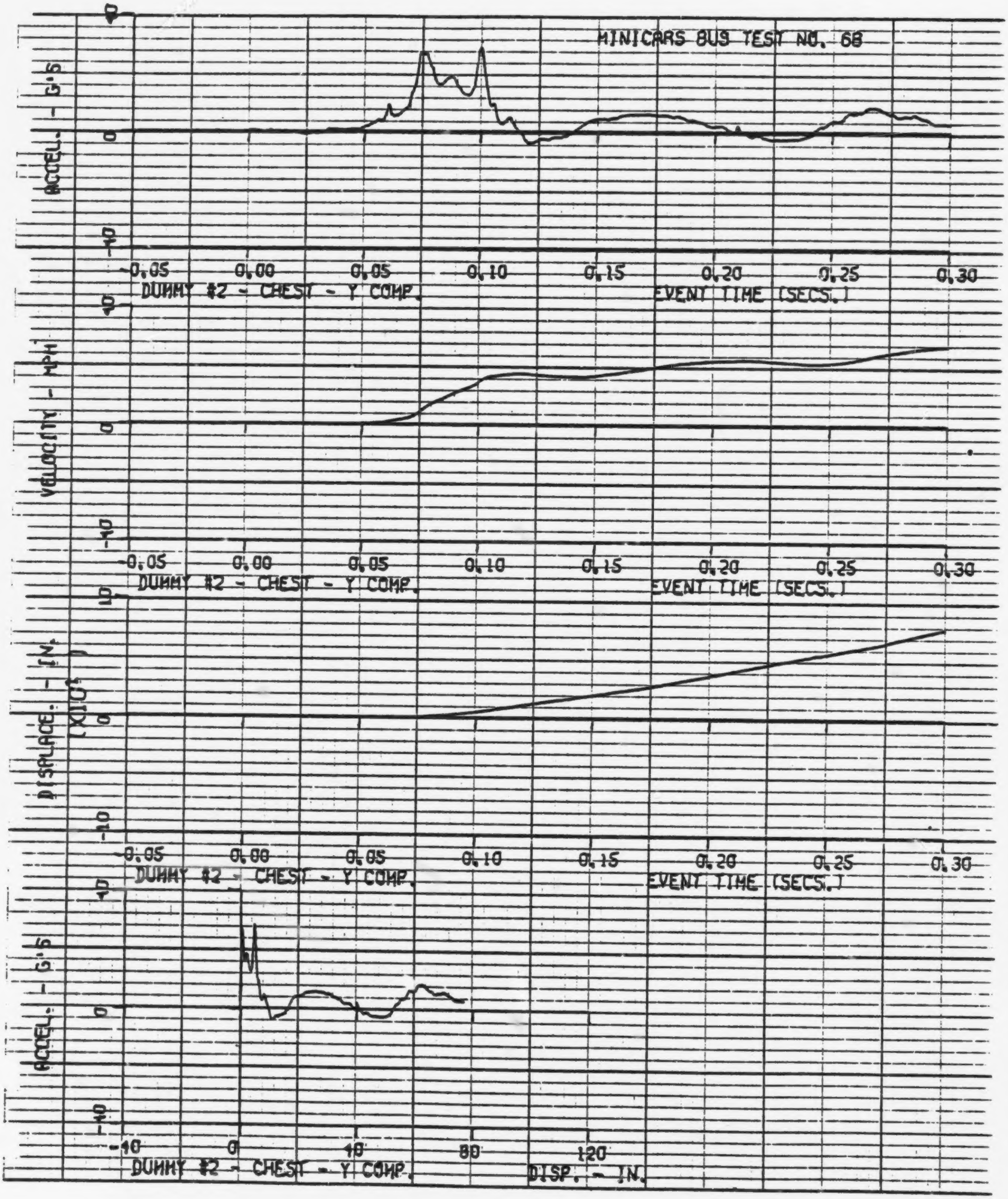
6440-V-4


MINICARS BUS TEST NO. 68
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - HEAD - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - HEAD - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - HEAD - Z COMP.
EVENT TIME (SECS.)


MINICARS BUS TEST NO. 58
ACCEL. - G'S
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX (X10¹)
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - HEAD
EVENT TIME (SECS.)

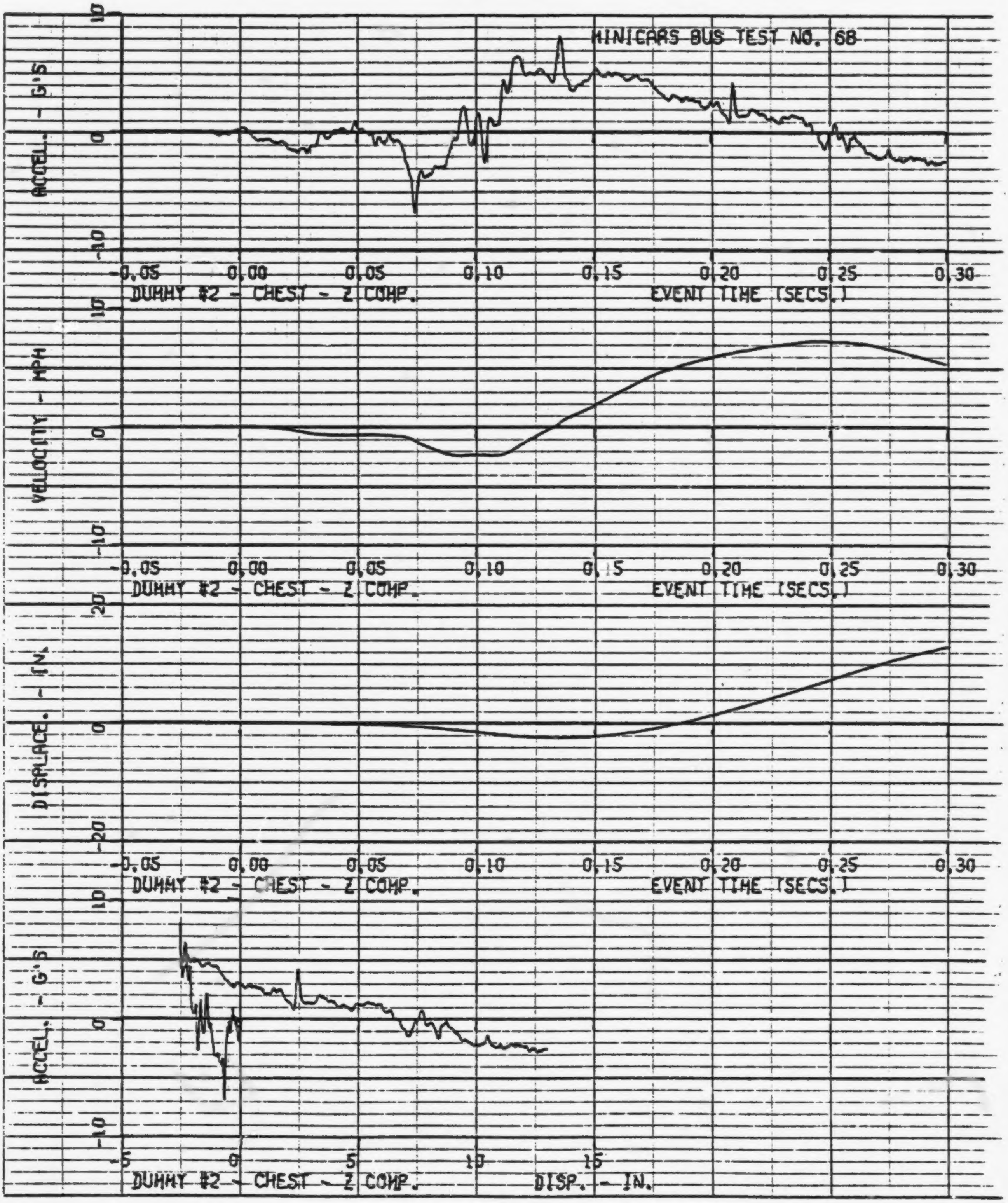

MINICARS BUS TEST NO. 68
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - X COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
24
20
16
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - X COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
(X10¹)
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
0
40
80
120
160
DUMMY #2 - CHEST - X COMP.
DISP. - IN.

6440-V-4


MINICARS BUS TEST NO. 68
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - Y COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - Y COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
(X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-40
0
40
80
120
DUMMY #2 - CHEST - Y COMP.
DISP. - IN.

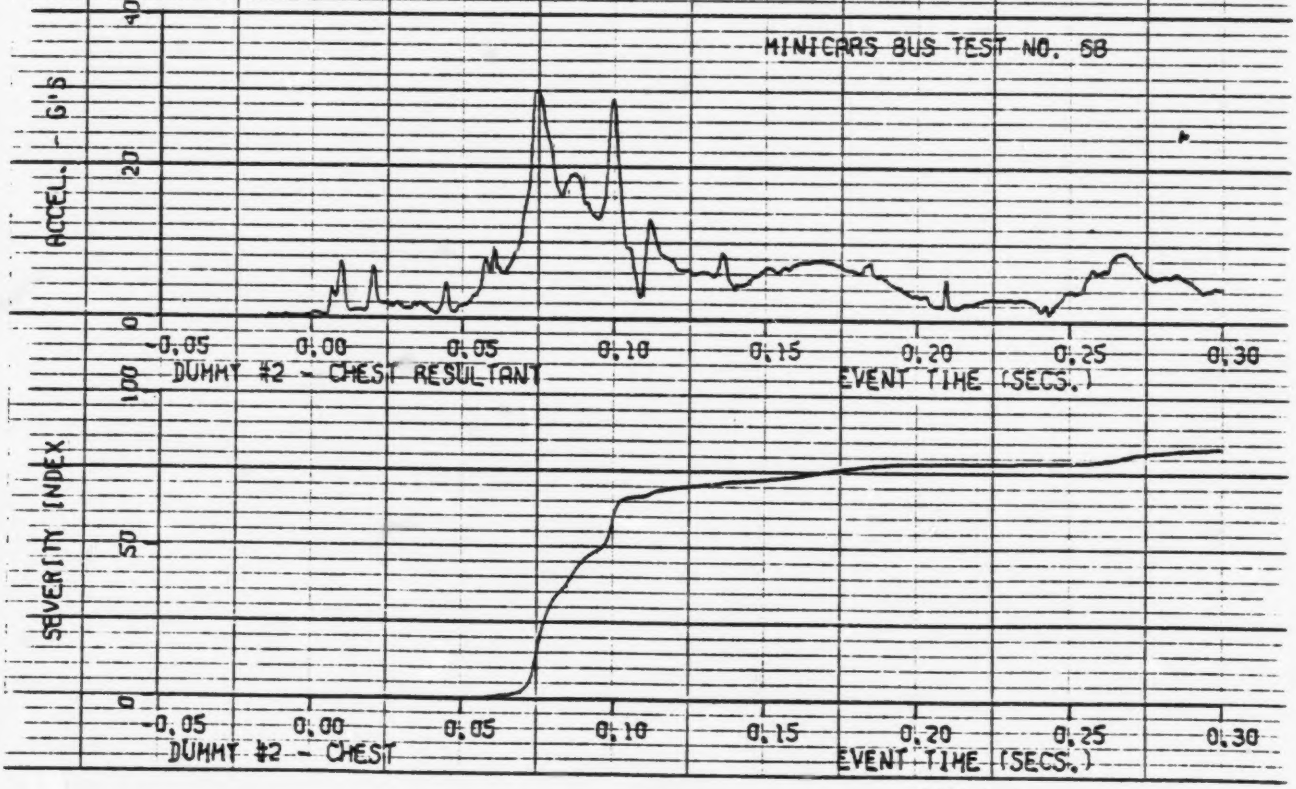
6440-V-4

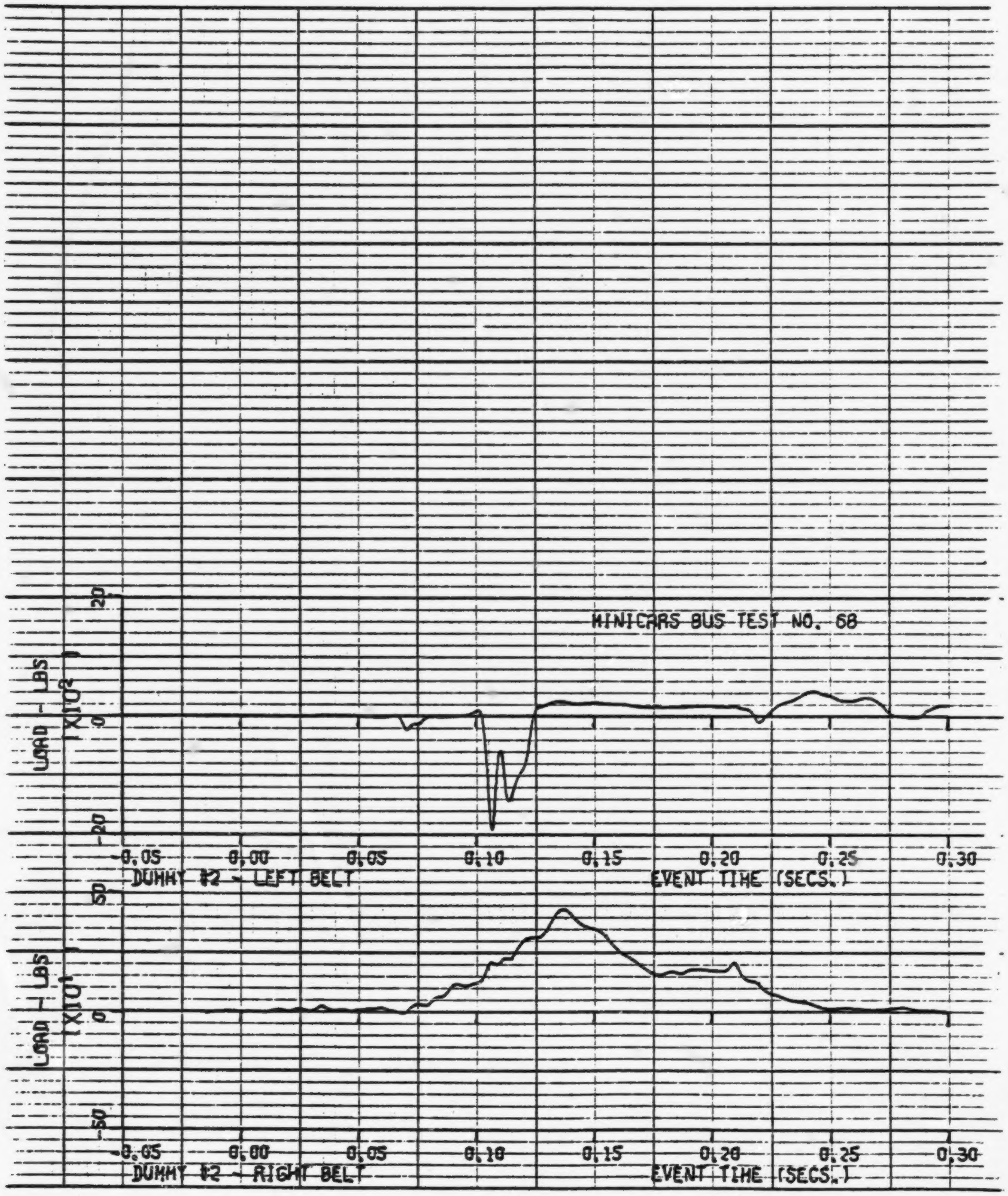
450


MINICARS BUS TEST NO. 68
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - Z COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - Z COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - Z COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-5
0
5
10
15
DUMMY #2 - CHEST - Z COMP.
DISP. - IN.

6440-V-4

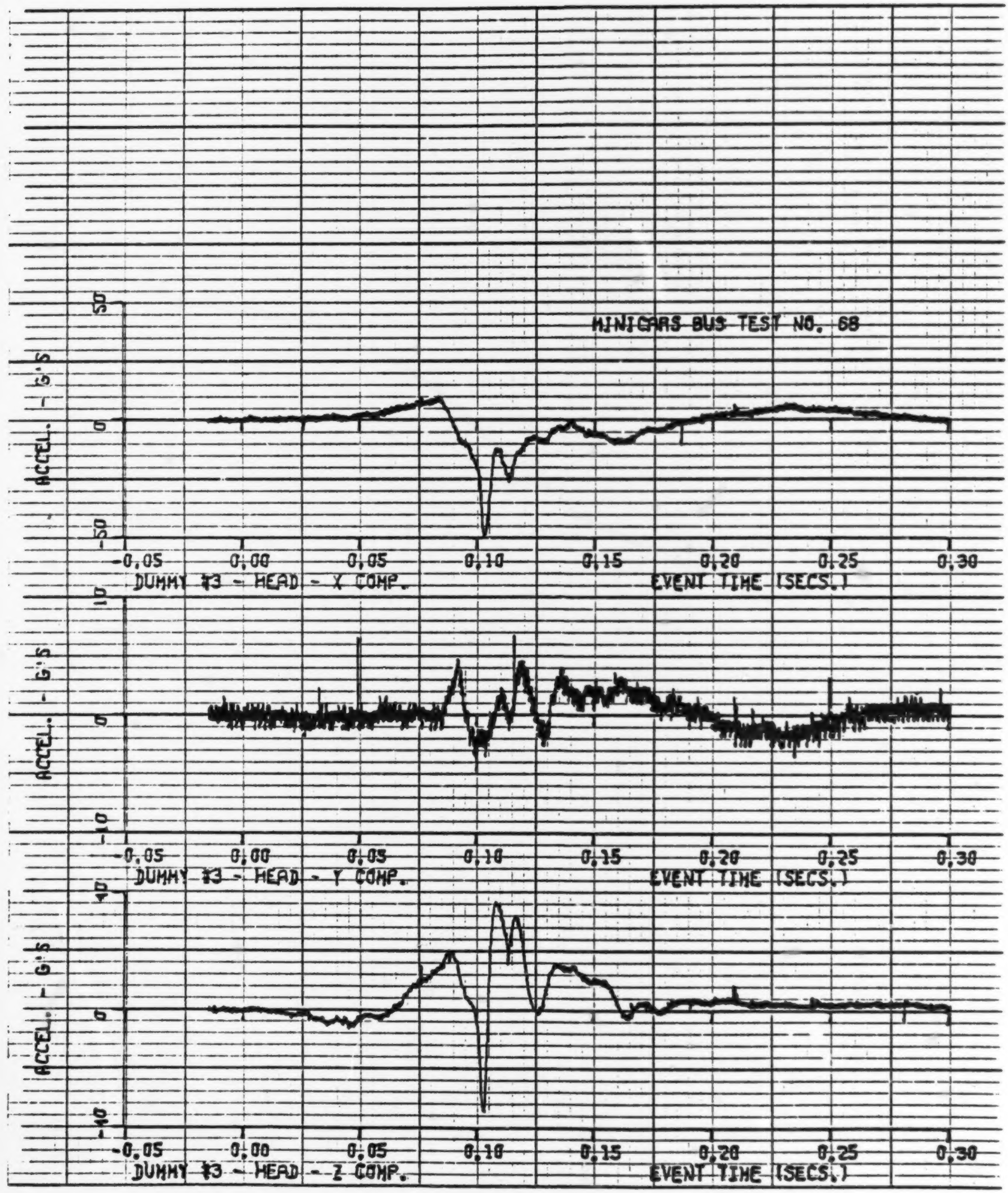
451


MINICARS BUS TEST NO. 58
ACCEL. - G'S
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
100
50
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST
EVENT TIME (SECS.)


MINICARS BUS TEST NO. 68
LOAD - LBS
(X10²)
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - LEFT BELT
EVENT TIME (SECS.)
LOAD - LBS
(X10¹)
50
0
-50
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - RIGHT BELT
EVENT TIME (SECS.)

6440-V-4

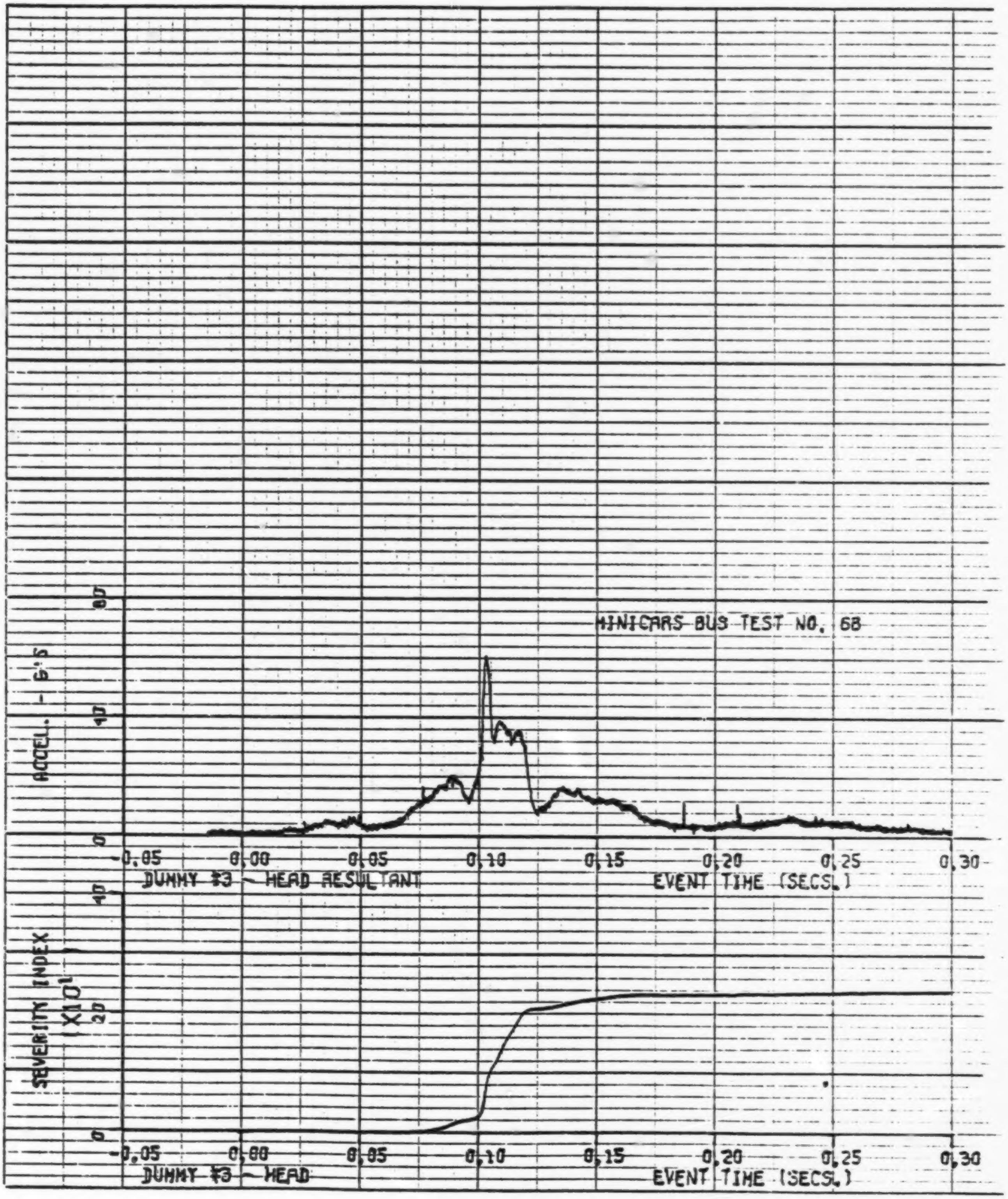
453



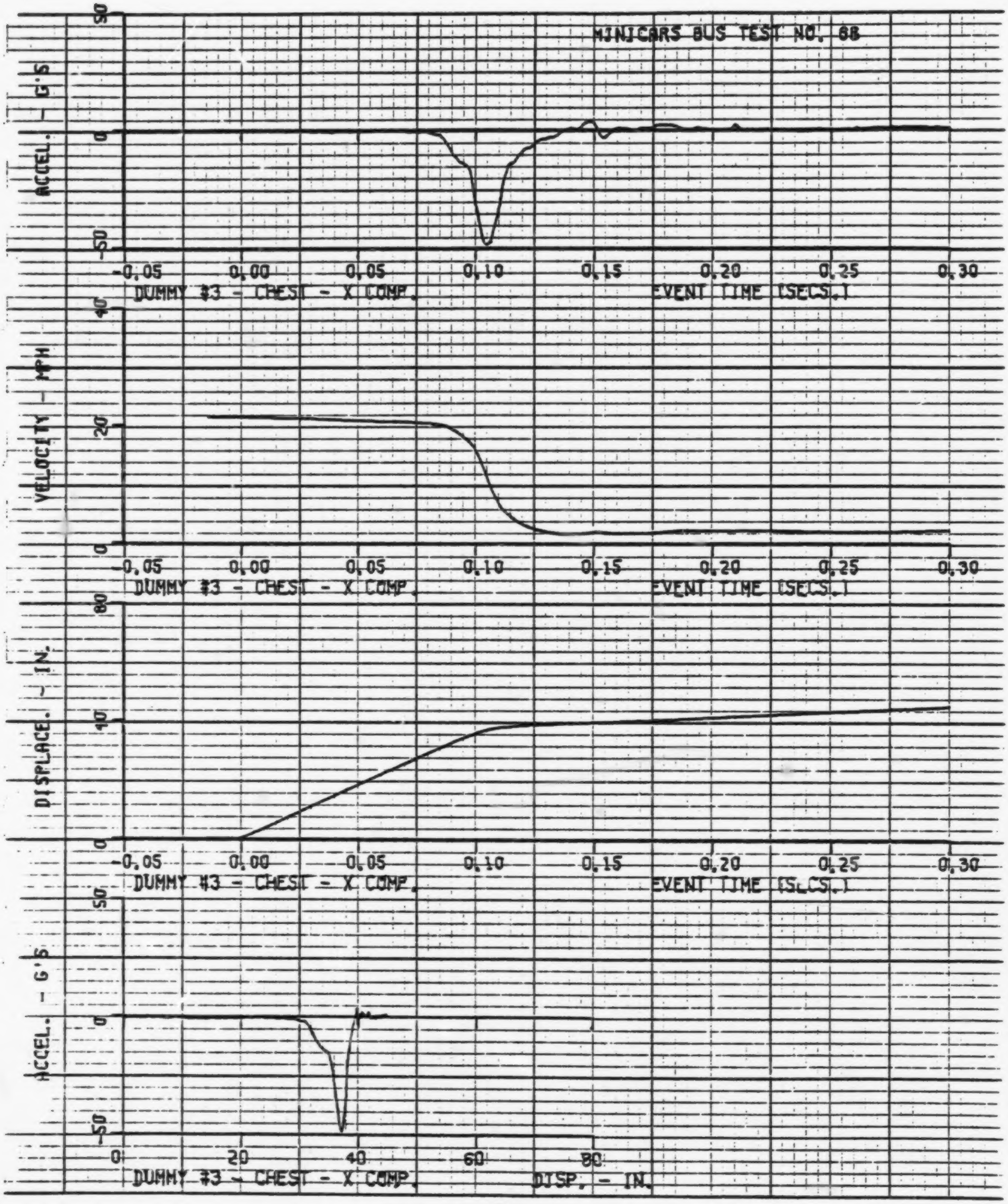
[redacted]

6440-V-4

454

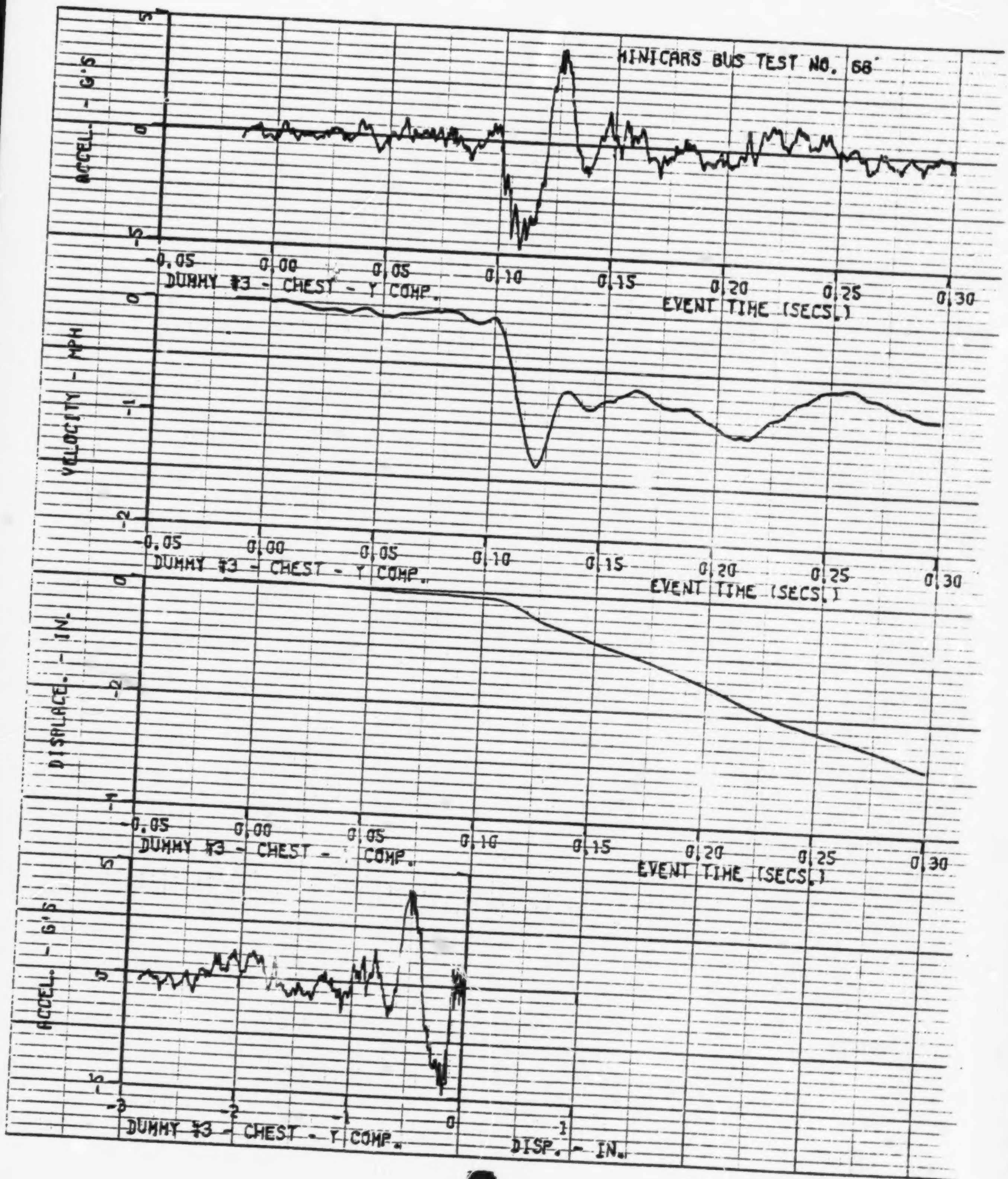

MINICARS BUS TEST NO. 68
ACCEL. - G'S
80
40
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
(X10¹)
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - HEAD
EVENT TIME (SECS.)

6440-V-4


MINICARS BUS TEST NO. 68
ACCEL. - G'S
50
0
-50
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - X COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - X COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
80
40
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
50
0
-50
0
20
40
60
80
DUMMY #3 - CHEST - X COMP.
DISP. - IN.

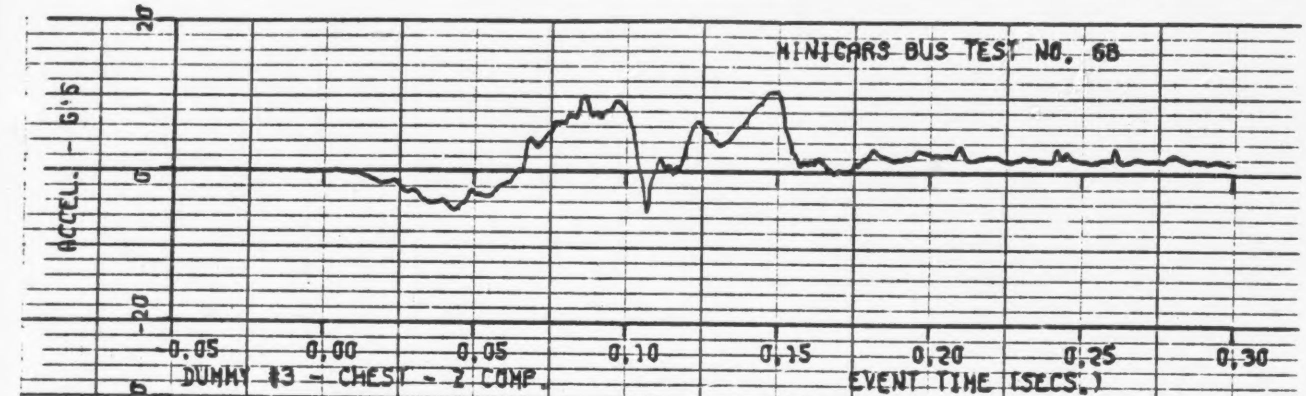
64A 0-V-4

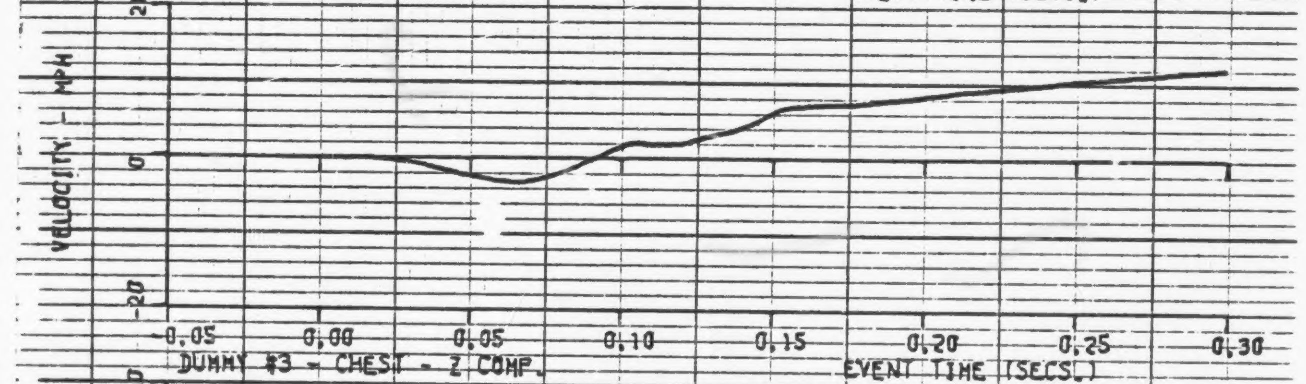
456

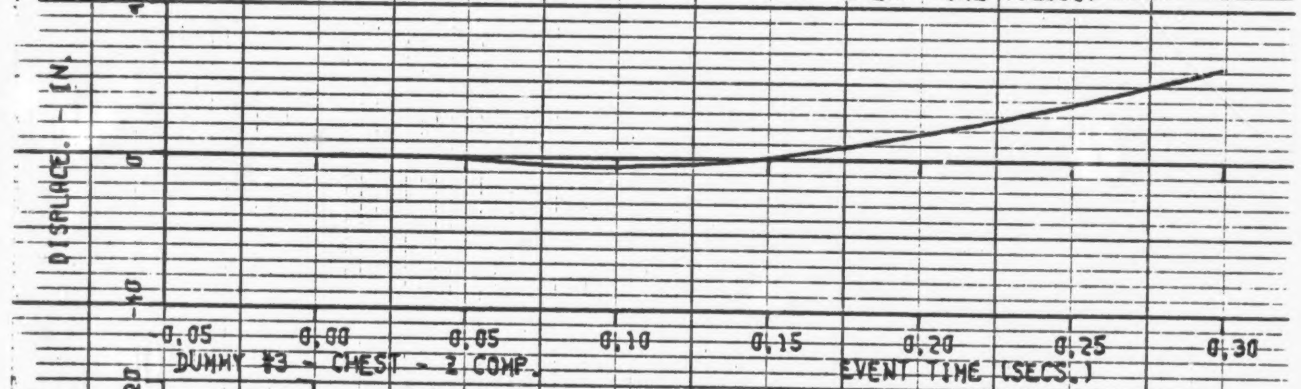

MINICARS BUS TEST NO. 68
ACCEL. - G'S
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - Y COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
0
-1
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - Y COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-2
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
5
0
-5
-3
-2
-1
0
1
DUMMY #3 - CHEST - Y COMP.
DISP. - IN.

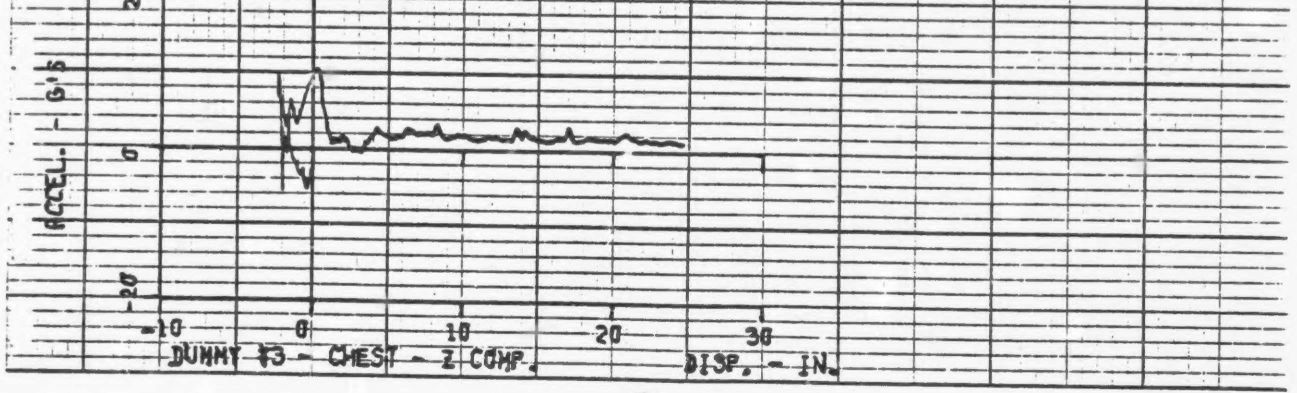
6440-V-4

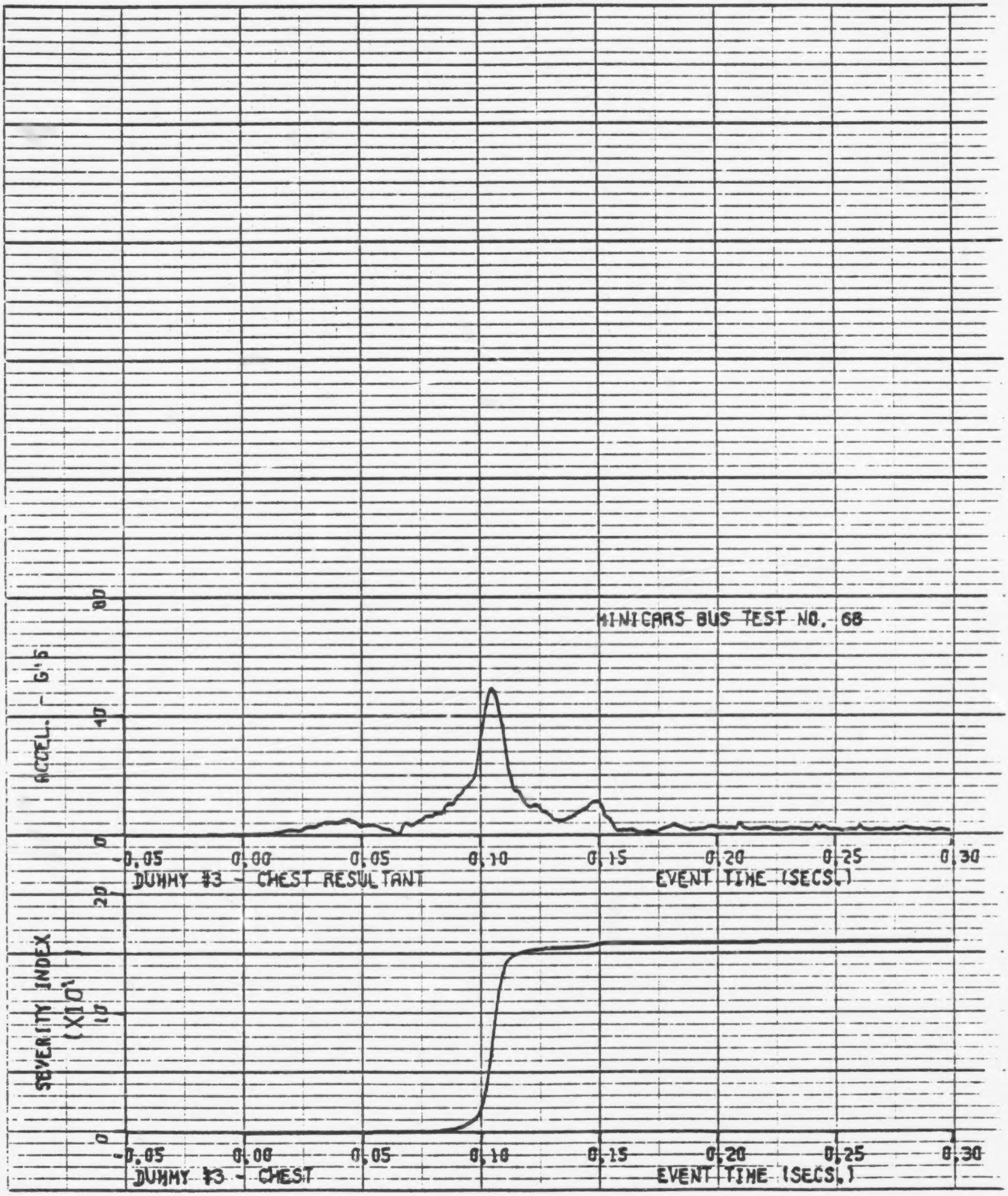
457

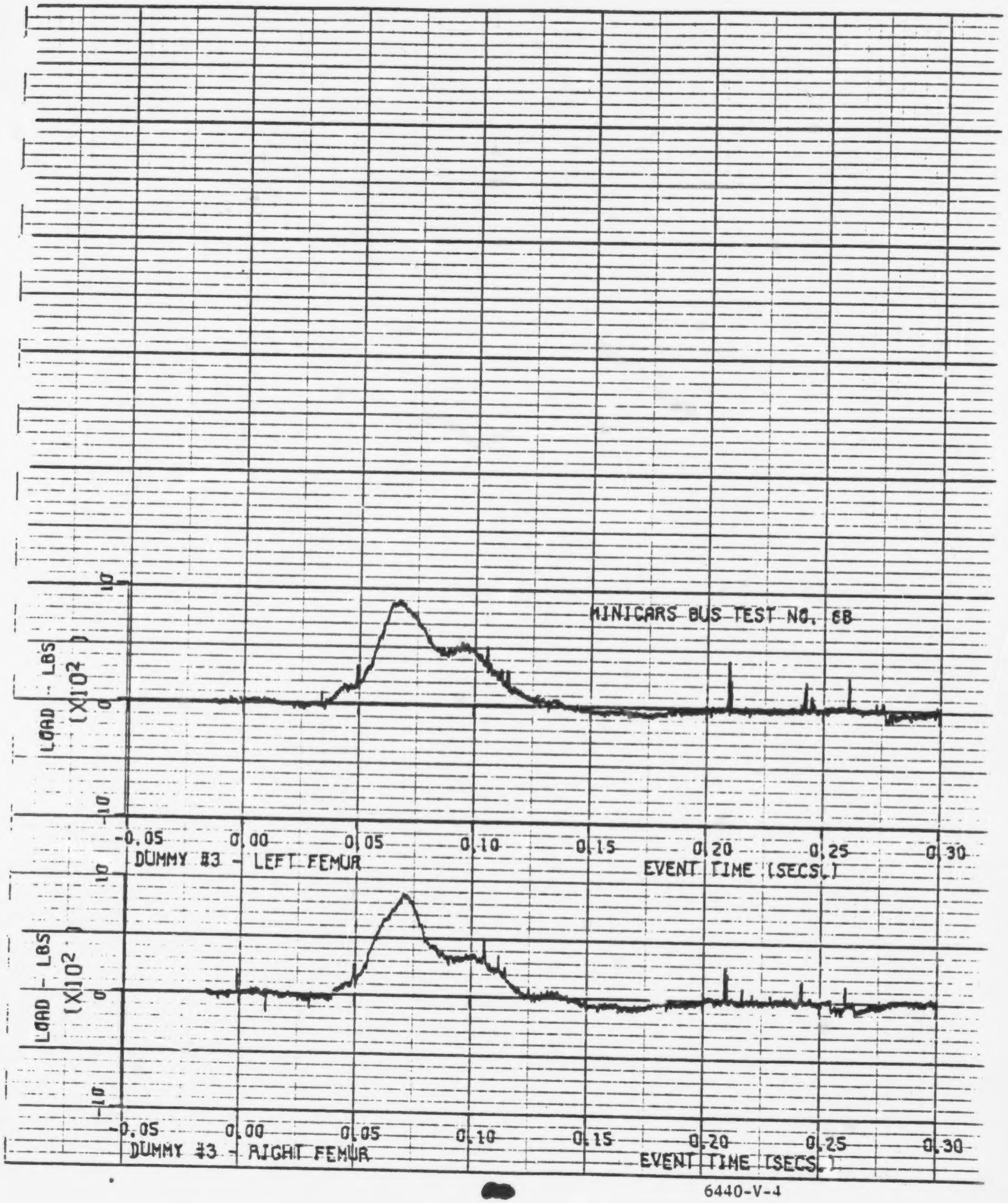

MINICARS BUS TEST NO. 68
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - Z COMP.
EVENT TIME (SECS.)


VELOCITY - MPH
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - Z COMP.
EVENT TIME (SECS.)

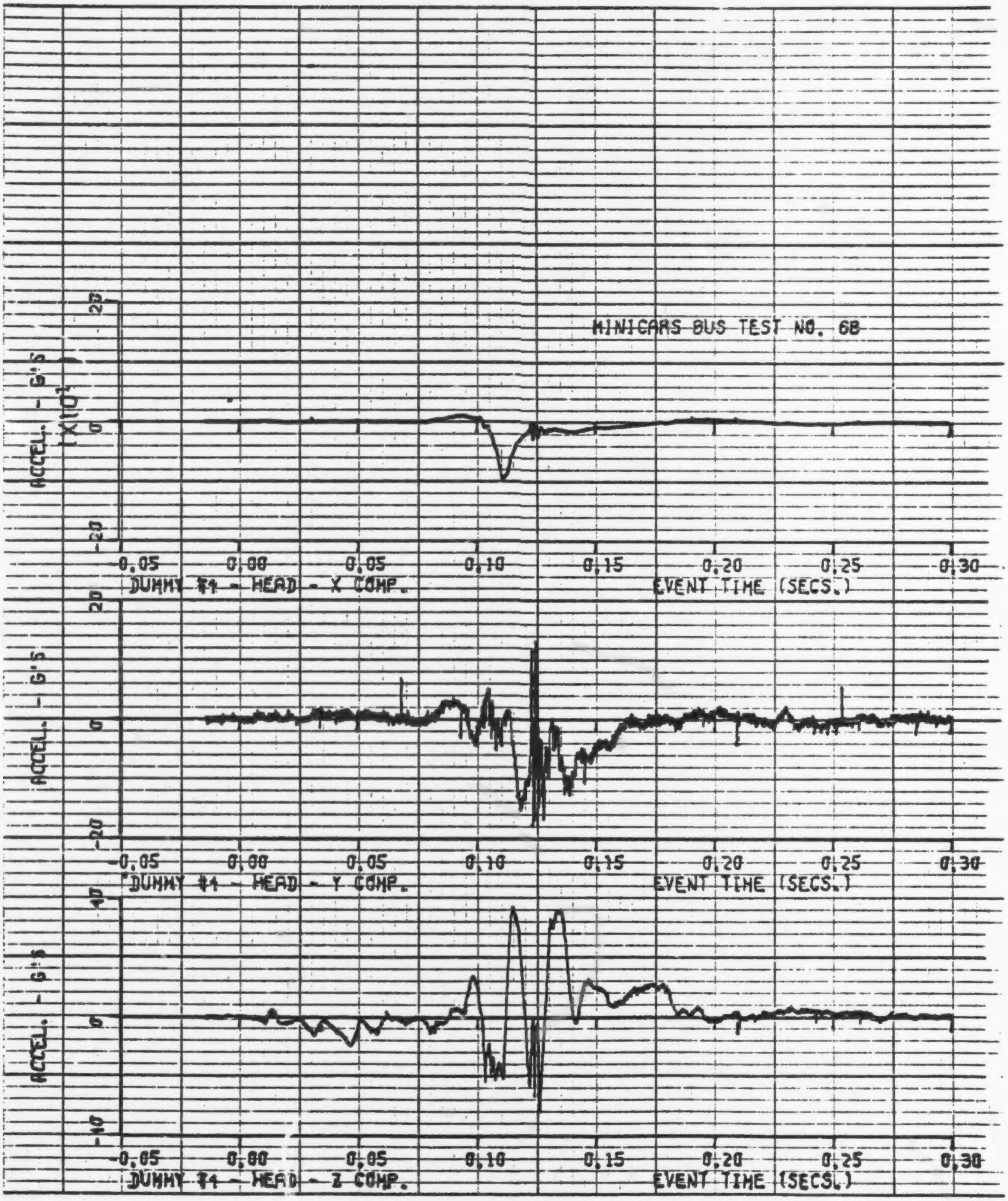

DISPLACE. - IN.
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - Z COMP.
EVENT TIME (SECS.)


ACCEL. - G'S
20
0
-20
-10
0
10
20
30
DUMMY #3 - CHEST - Z COMP.
DISP. - IN.

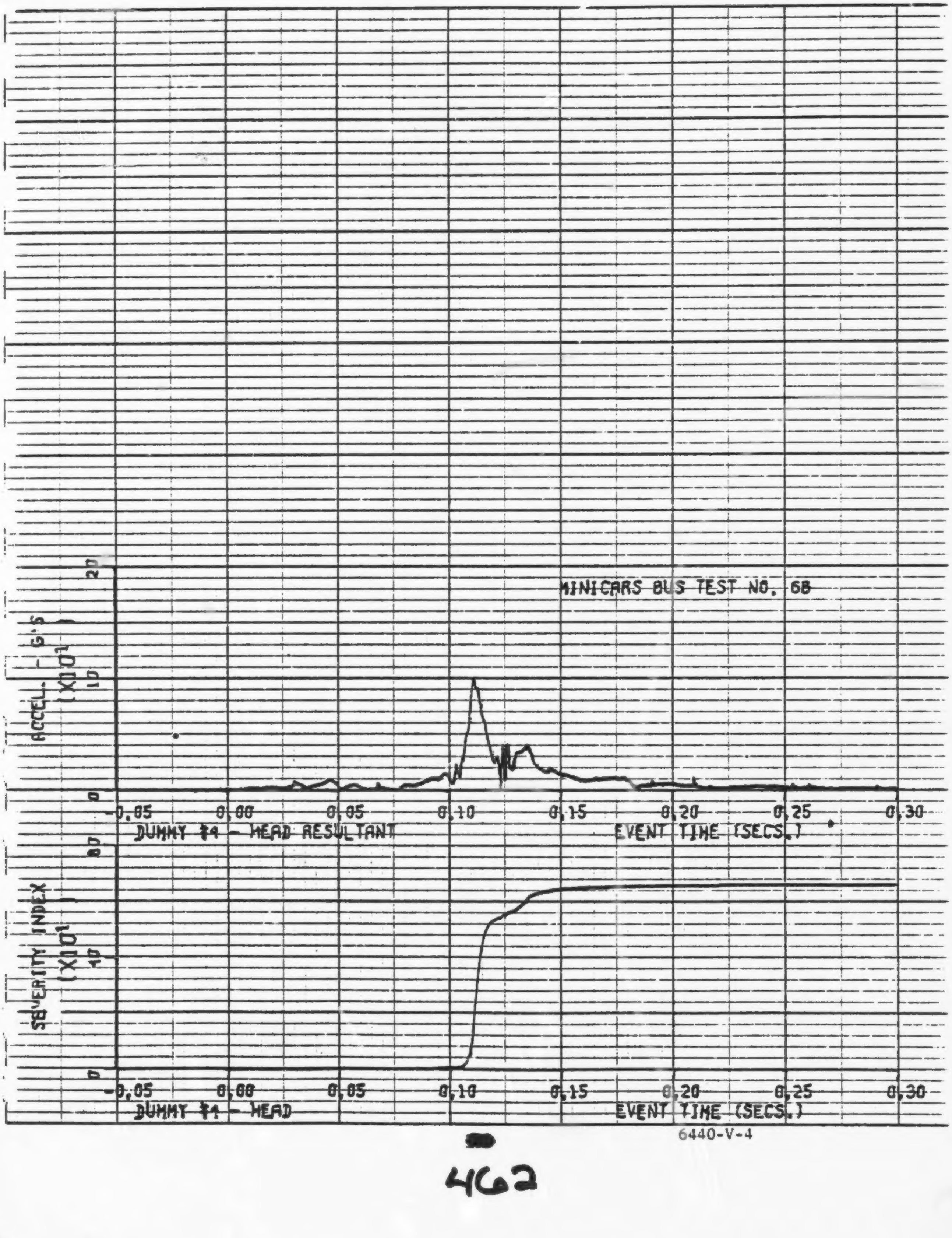

MINICARS BUS TEST NO. 68
80
ACCEL. - G'S
40
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST RESULTANT
EVENT TIME (SECS.)
20
SEVERITY INDEX (X10¹)
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST
EVENT TIME (SECS.)


MINICARS BUS TEST NO. 6B
LOAD - LBS (X10²)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - LEFT FEMUR
EVENT TIME (SECS.)
LOAD - LBS (X10²)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - RIGHT FEMUR
EVENT TIME (SECS.)

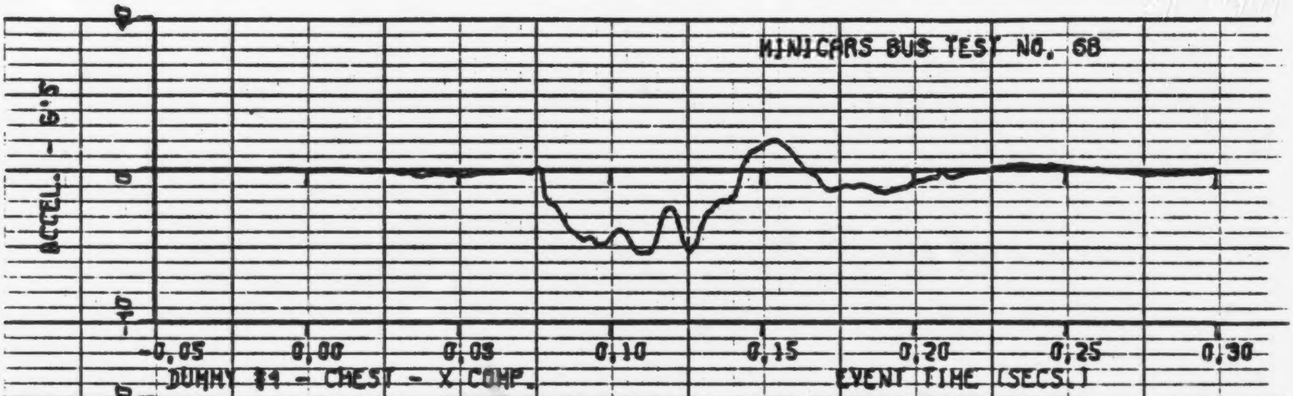
6440-V-4

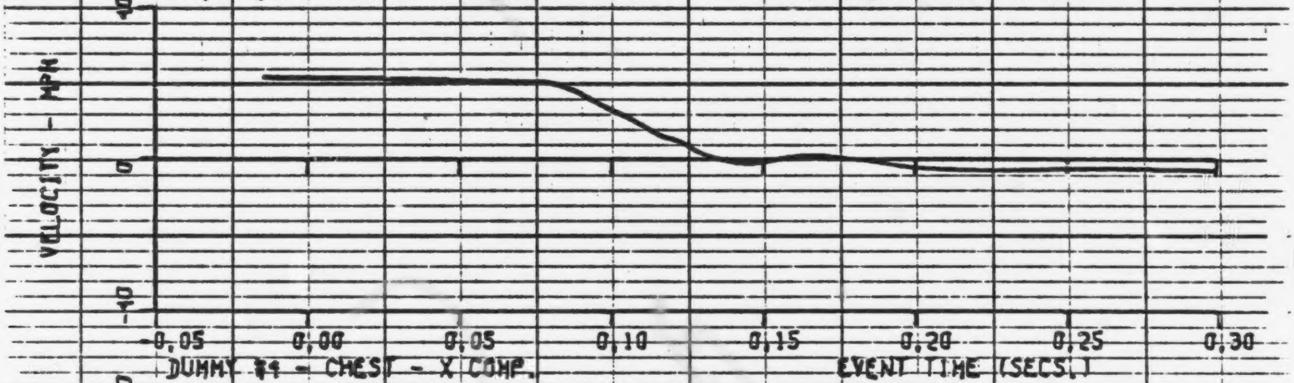

MINICARS BUS TEST NO. 68
ACCEL. - G'S (X10¹)
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - HEAD - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - HEAD - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - HEAD - Z COMP.
EVENT TIME (SECS.)

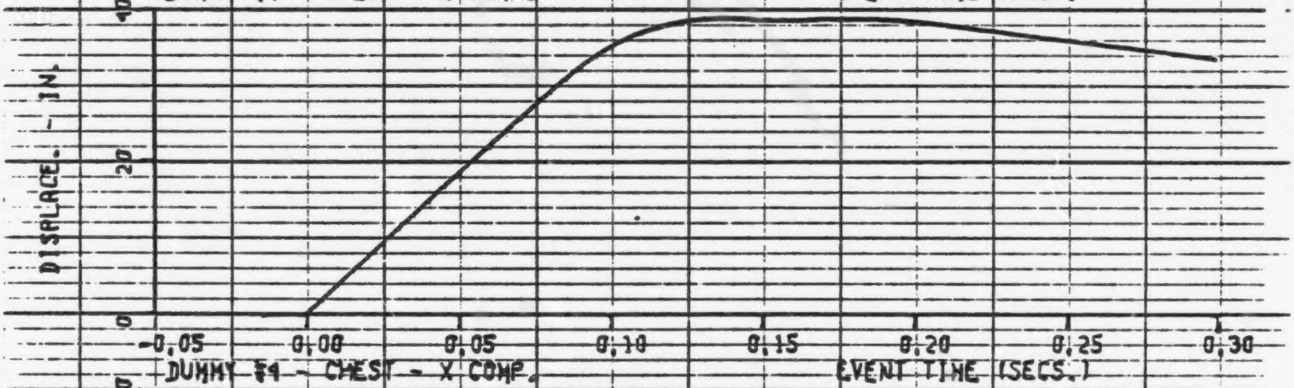
6440-V-4

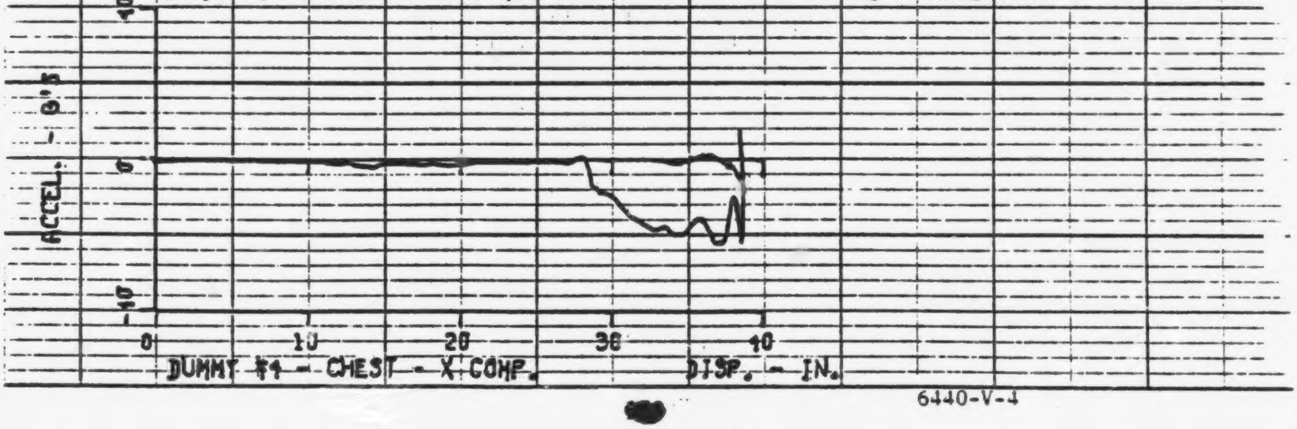

MINICARS BUS TEST NO. 68
ACCEL. - G'S (X10¹)
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX (X10¹)
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - HEAD
EVENT TIME (SECS.)

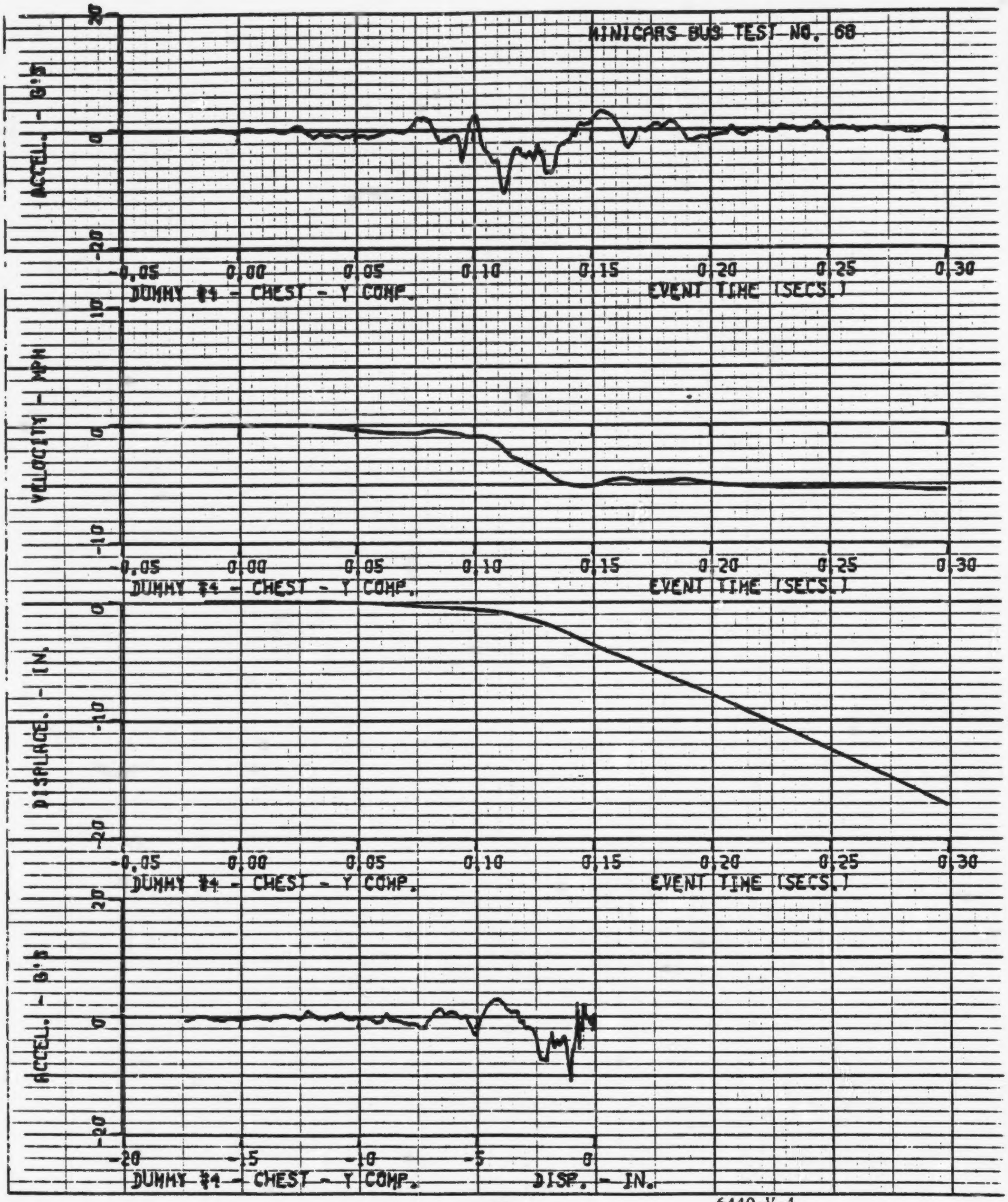
6440-V-4


MINICARS BUS TEST NO. 68
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - X COMP.
EVENT TIME (SECS.)


VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - X COMP.
EVENT TIME (SECS.)

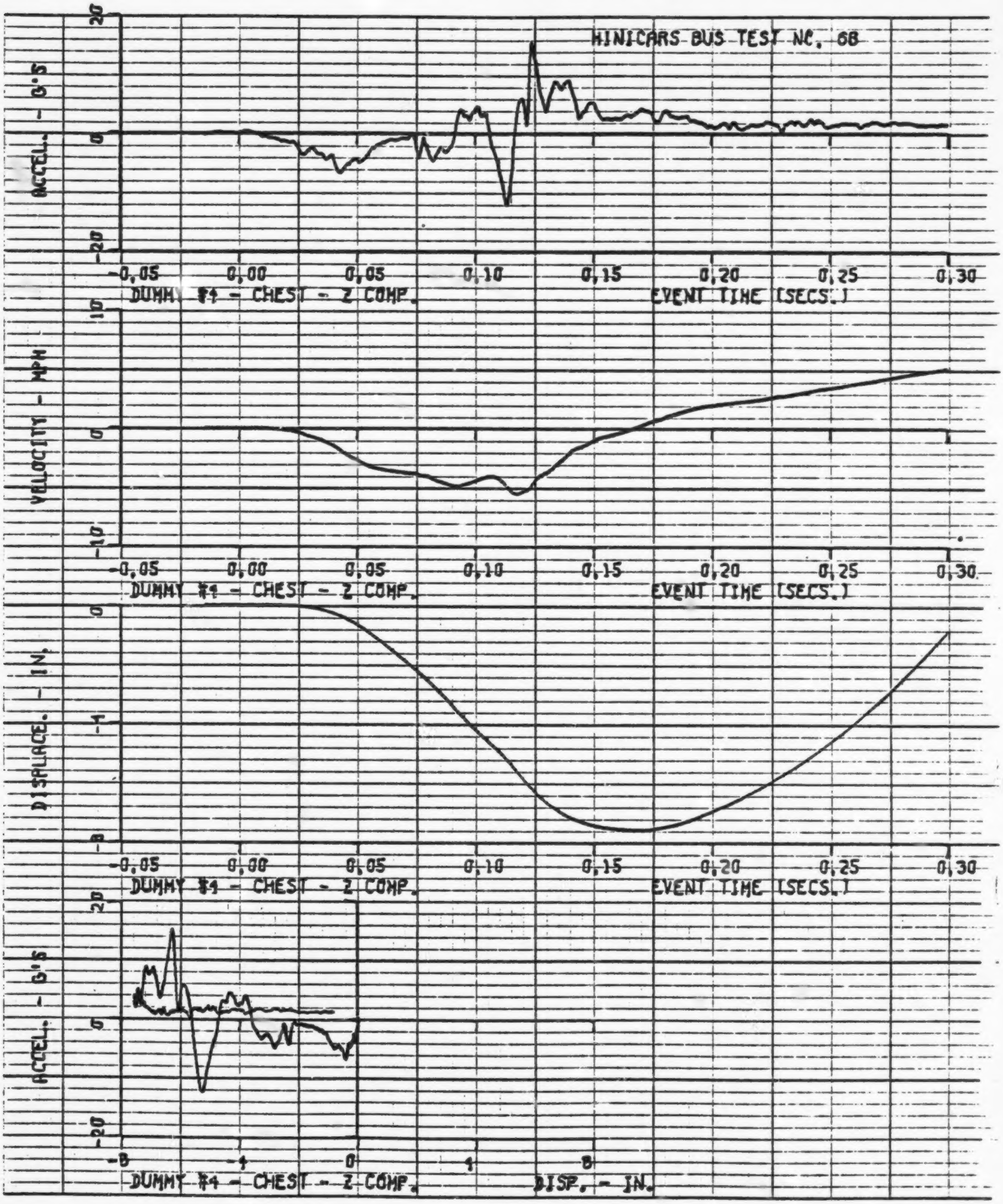

DISPLACE. - IN.
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - X COMP.
EVENT TIME (SECS.)

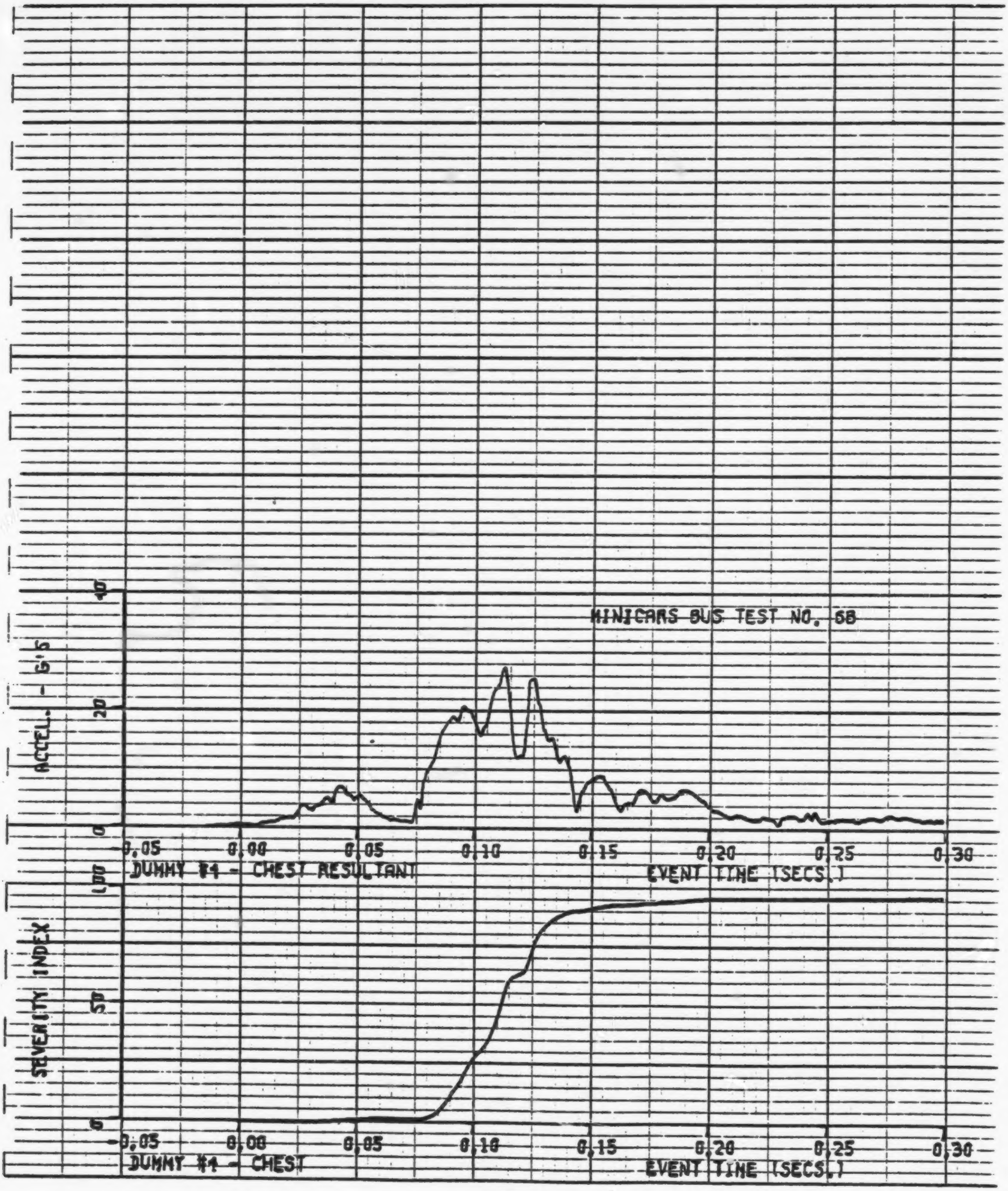

ACCEL. - G'S
10
0
-10
0
10
20
30
40
DUMMY #4 - CHEST - X COMP.
DISP. - IN.


MINICARS BUS TEST NO. 68
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Y COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Y COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-10
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-20
-15
-10
-5
0
DUMMY #4 - CHEST - Y COMP.
DISP. - IN.

6440-V-4

464

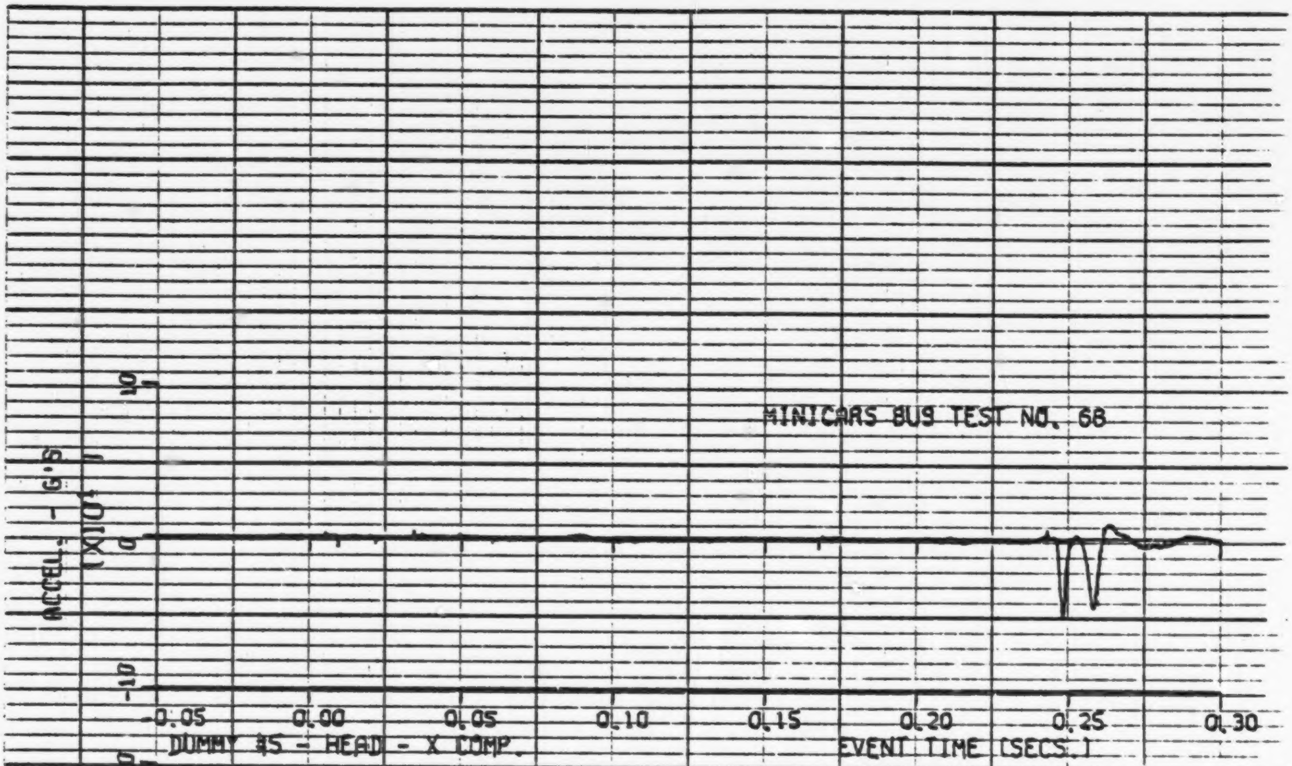

MINICARS BUS TEST NO. 68
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Z COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Z COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-1
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Z COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-2
-1
0
1
2
DUMMY #4 - CHEST - Z COMP.
DISP. - IN.



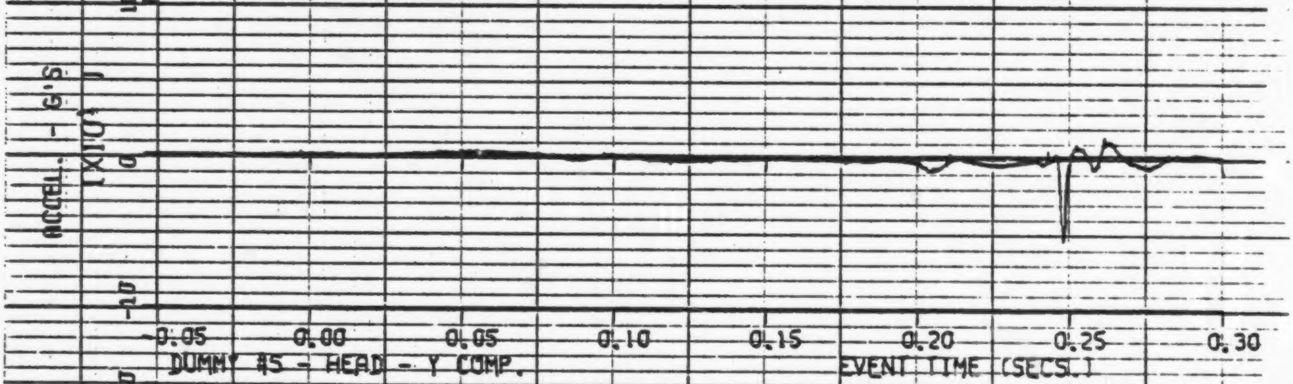
6440-V-4

[redacted]

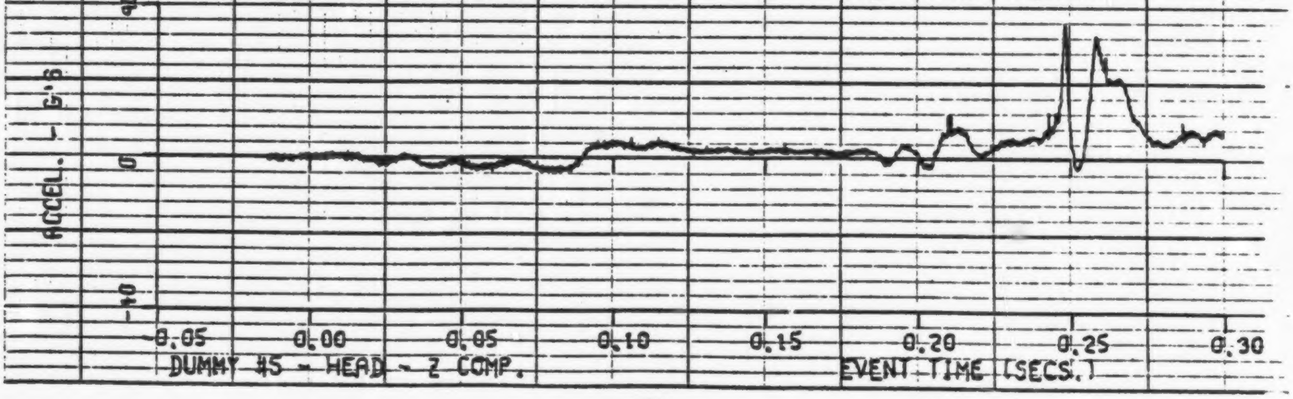
4666



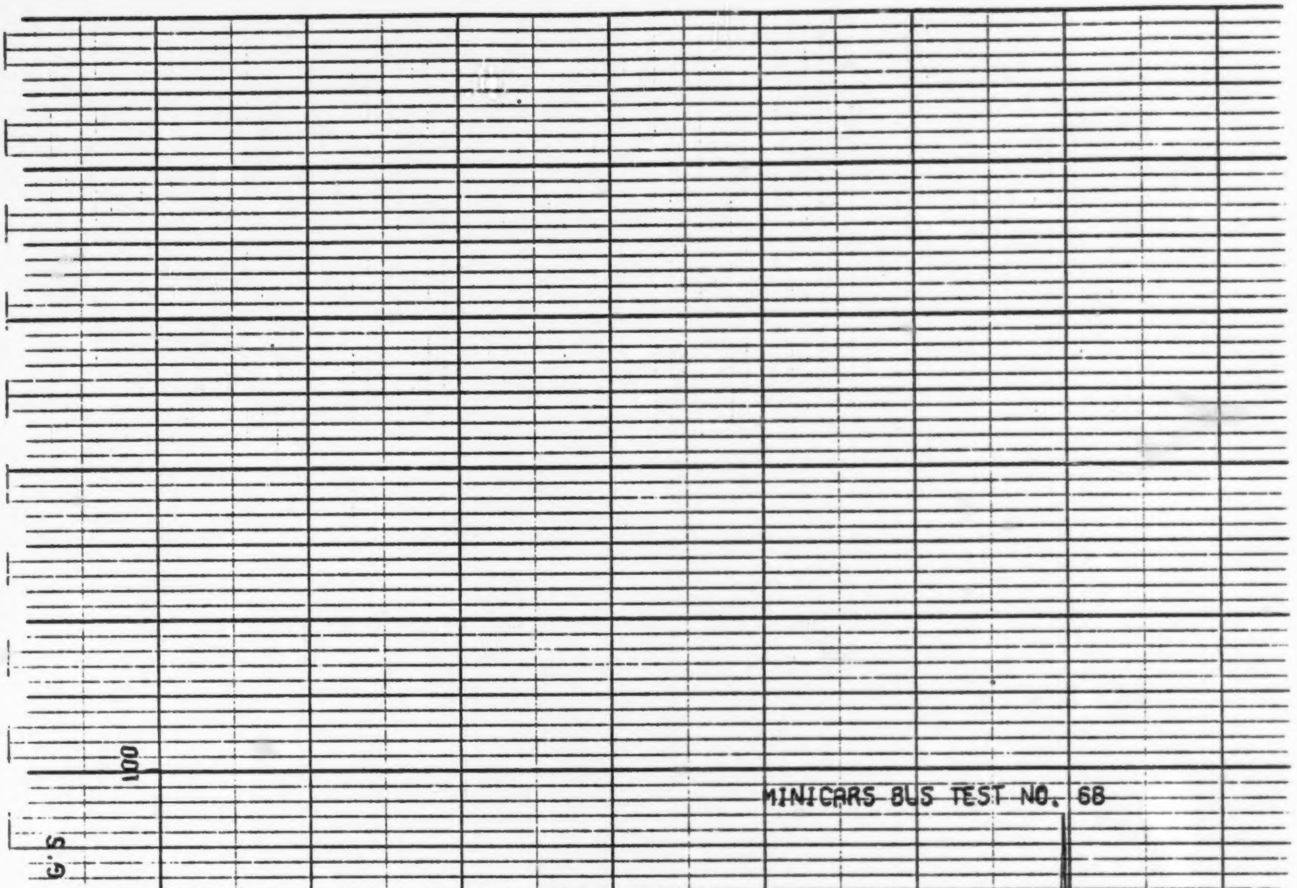
DUMMY #5 - HEAD - X COMP.



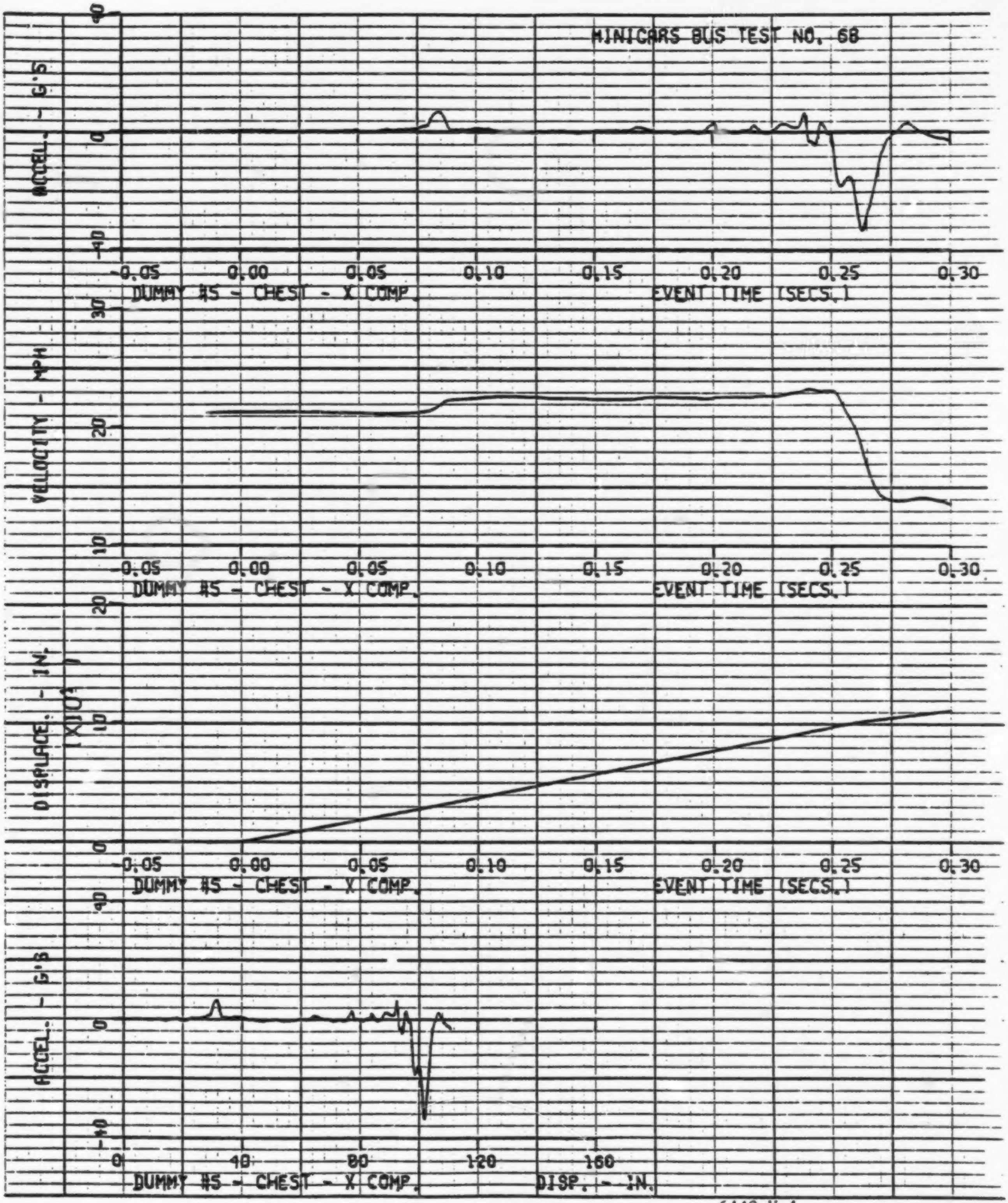
DUMMY #5 - HEAD - Y COMP.



DUMMY #5 - HEAD - Z COMP.

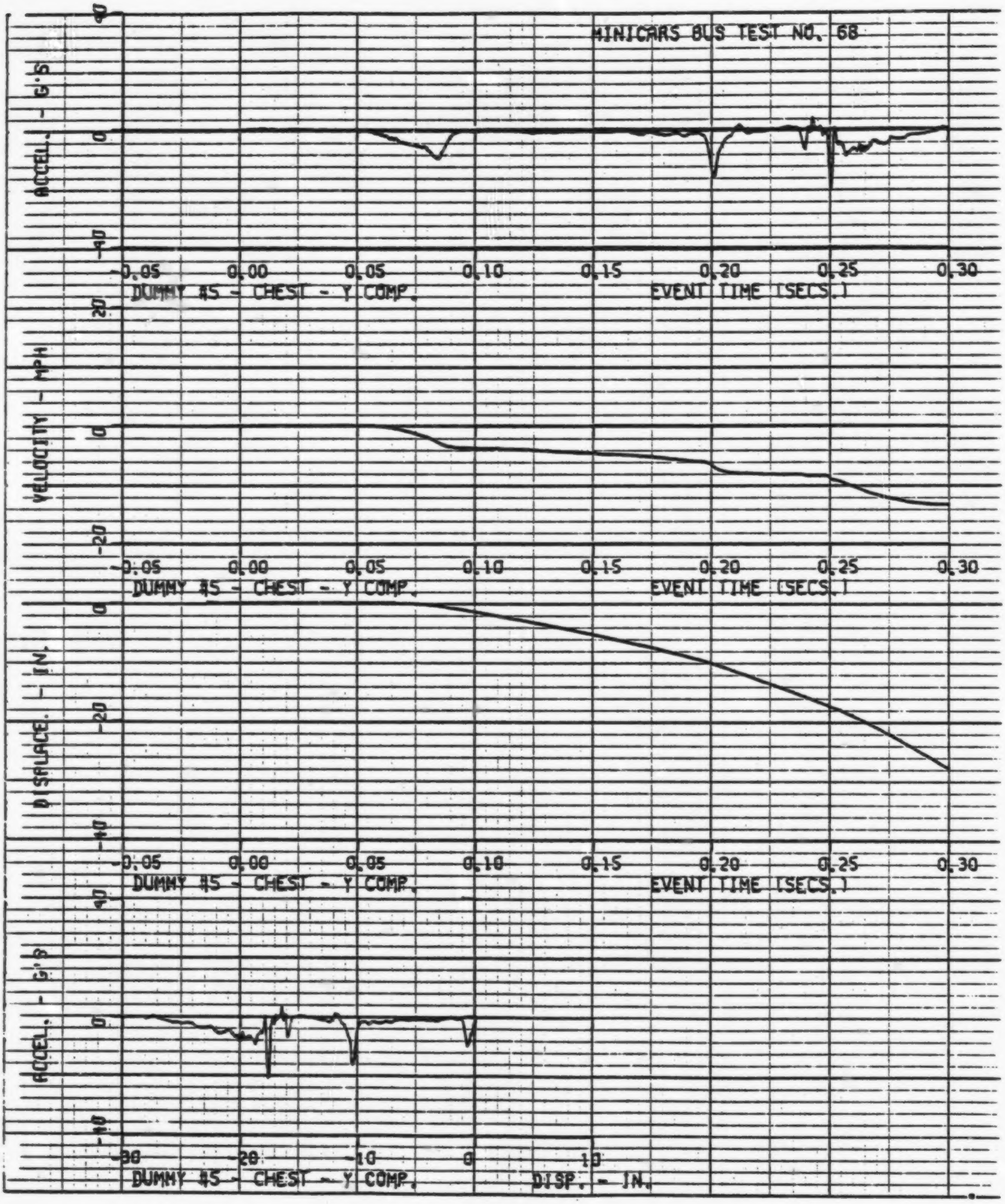

MINICARS BUS TEST NO. 68
ACCEL. - G'S
100
50
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX (X10²)
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - HEAD
EVENT TIME (SECS.)

6440-V-4


MINICARS BUS TEST NO. 68
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - X COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
30
20
10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - X COMP.
EVENT TIME (SECS.)
DISPLACE. - IN. (X10¹)
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
0
40
80
120
160
DUMMY #5 - CHEST - X COMP.
DISP. - IN.

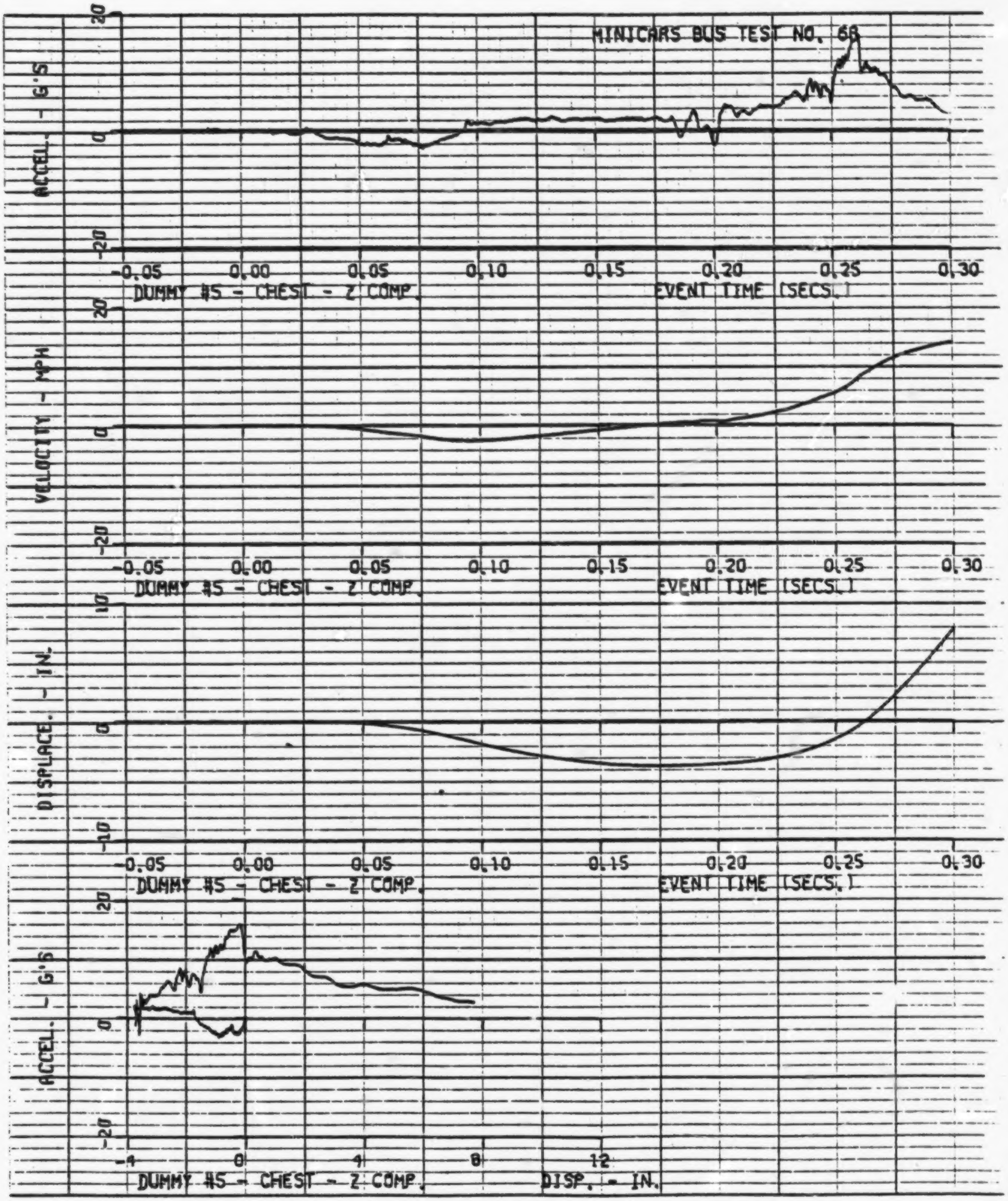
6440-V-4

469

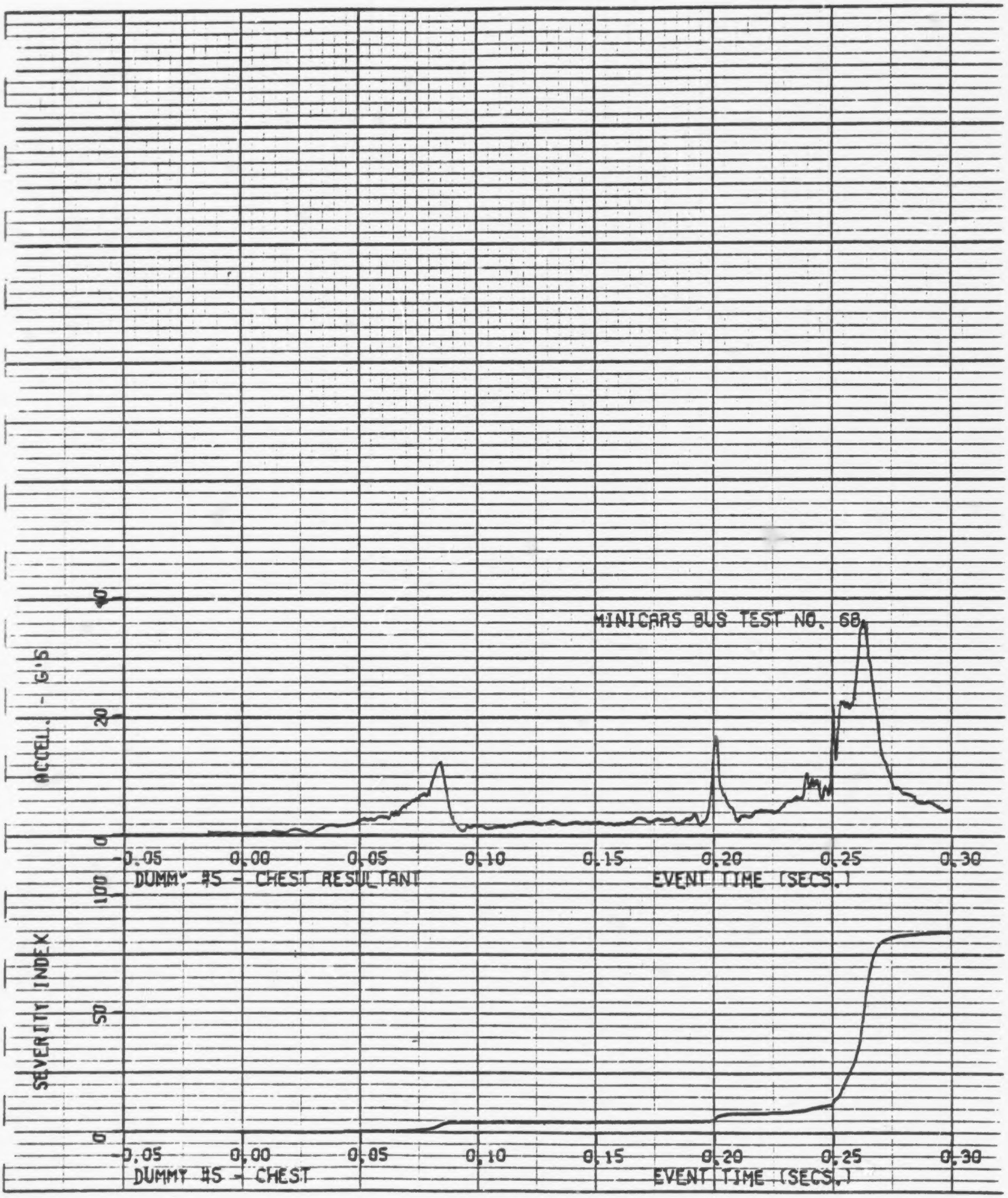

MINICARS BUS TEST NO. 68
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Y COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Y COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-20
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
-30
-20
-10
0
10
DUMMY #5 - CHEST - Y COMP.
DISP. - IN.

6440-V-4

470

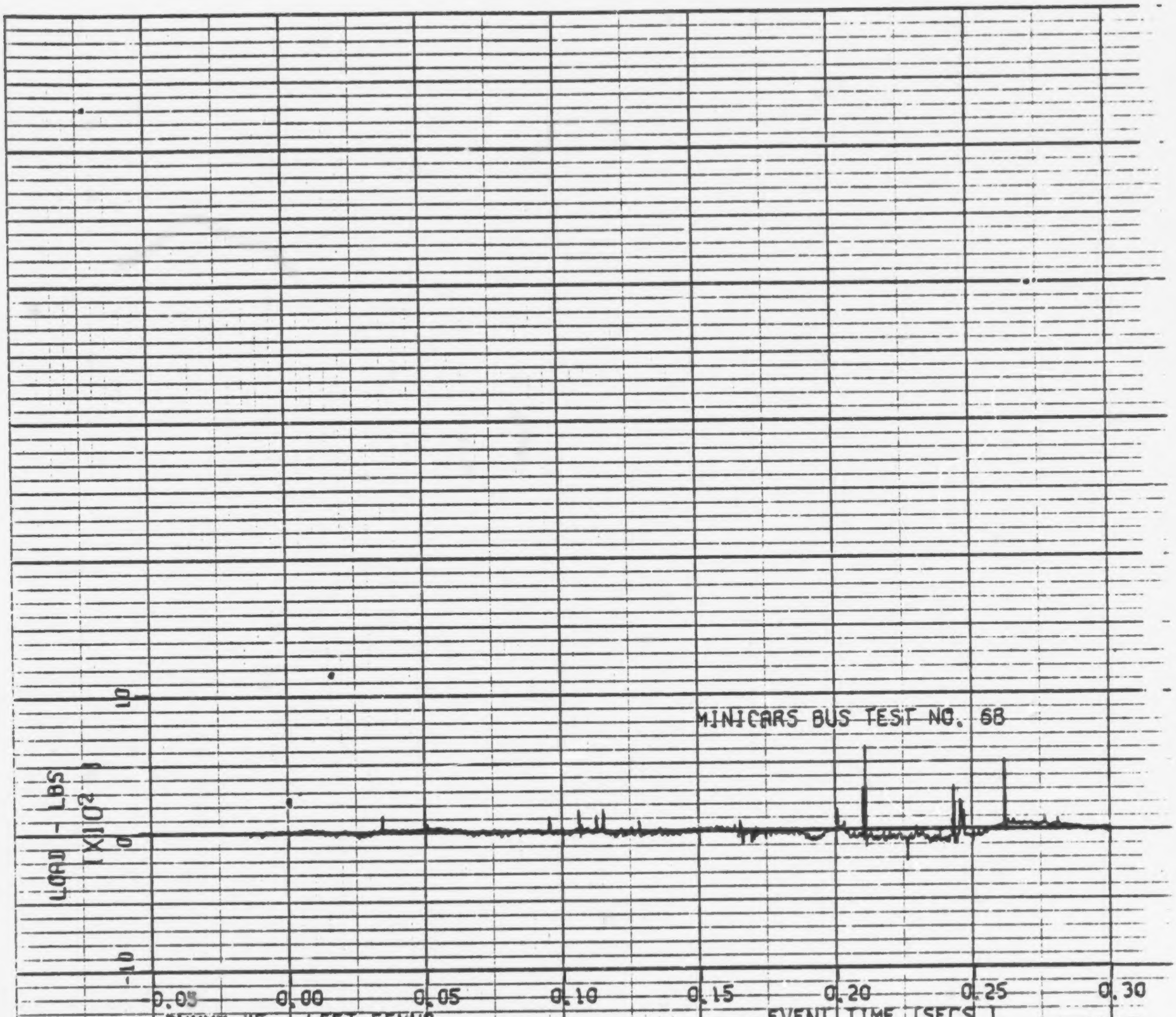

MINICARS BUS TEST NO. 68
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Z COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Z COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Z COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-4
0
4
8
12
DUMMY #5 - CHEST - Z COMP.
DISP. - IN.

6440-V-4


MINICARS BUS TEST NO. 68
ACCEL. - G'S
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
100
50
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST
EVENT TIME (SECS.)

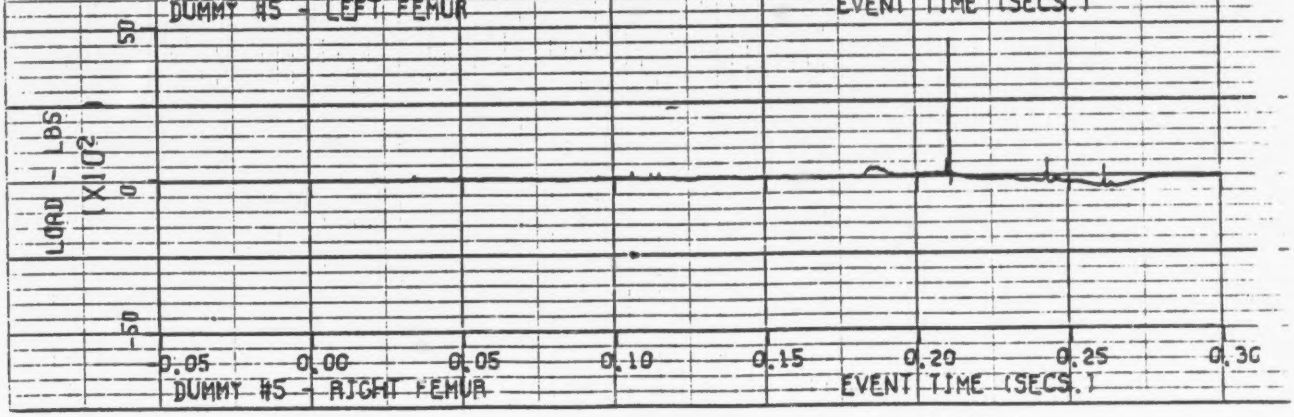
6440-V-4

472



DUMMY #5 - LEFT FEMUR

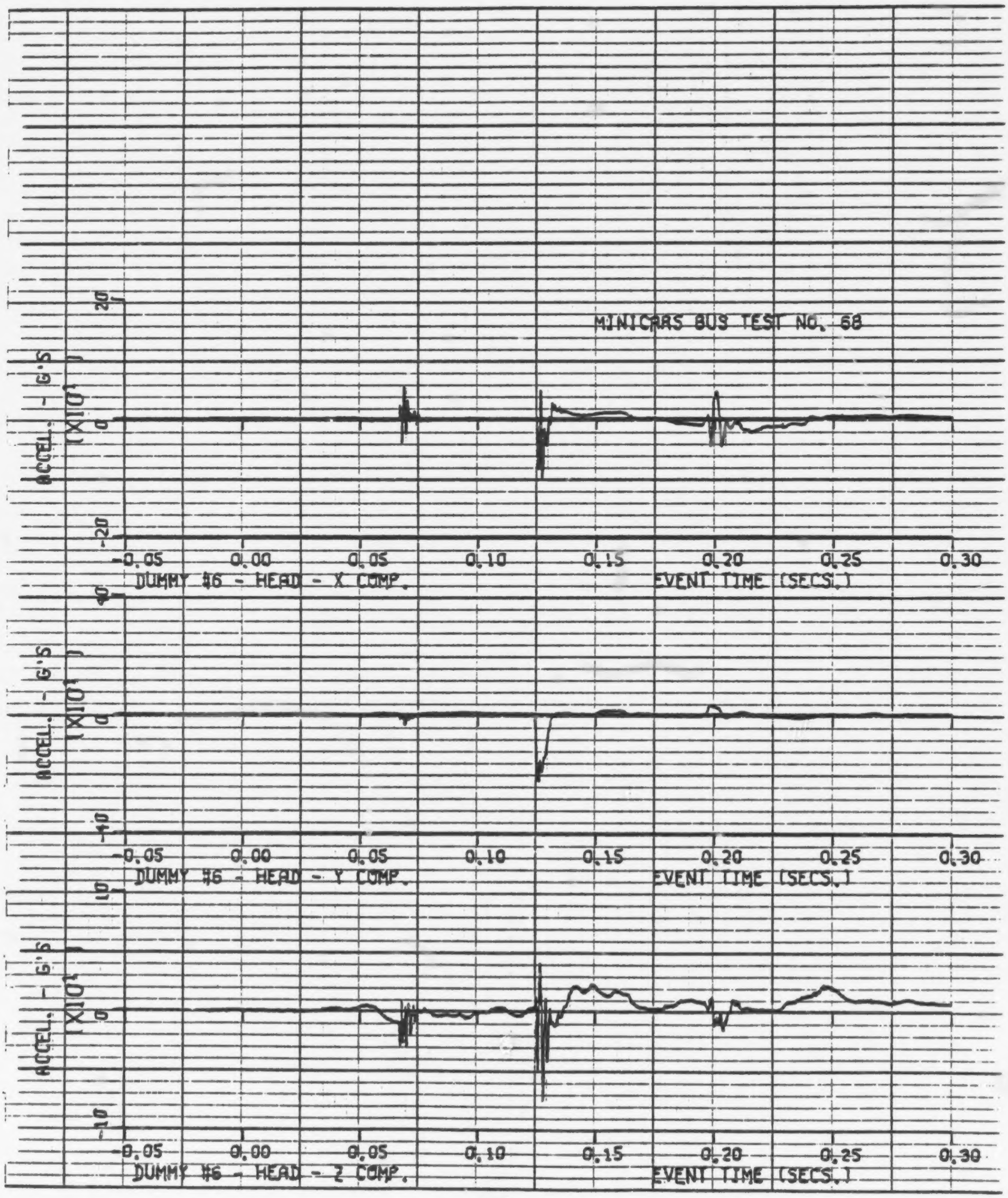
EVENT TIME (SECS.)



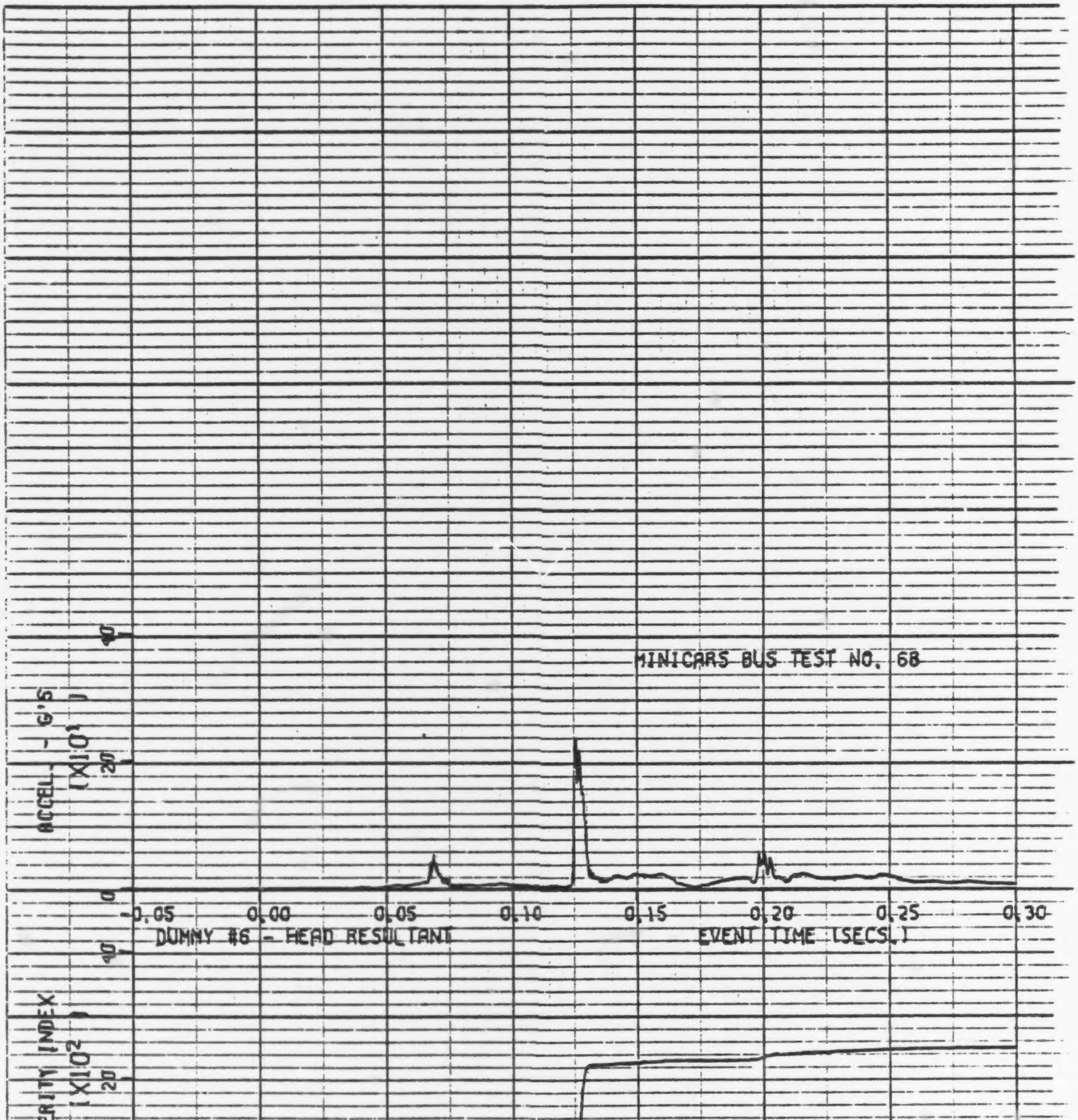
DUMMY #5 - RIGHT FEMUR

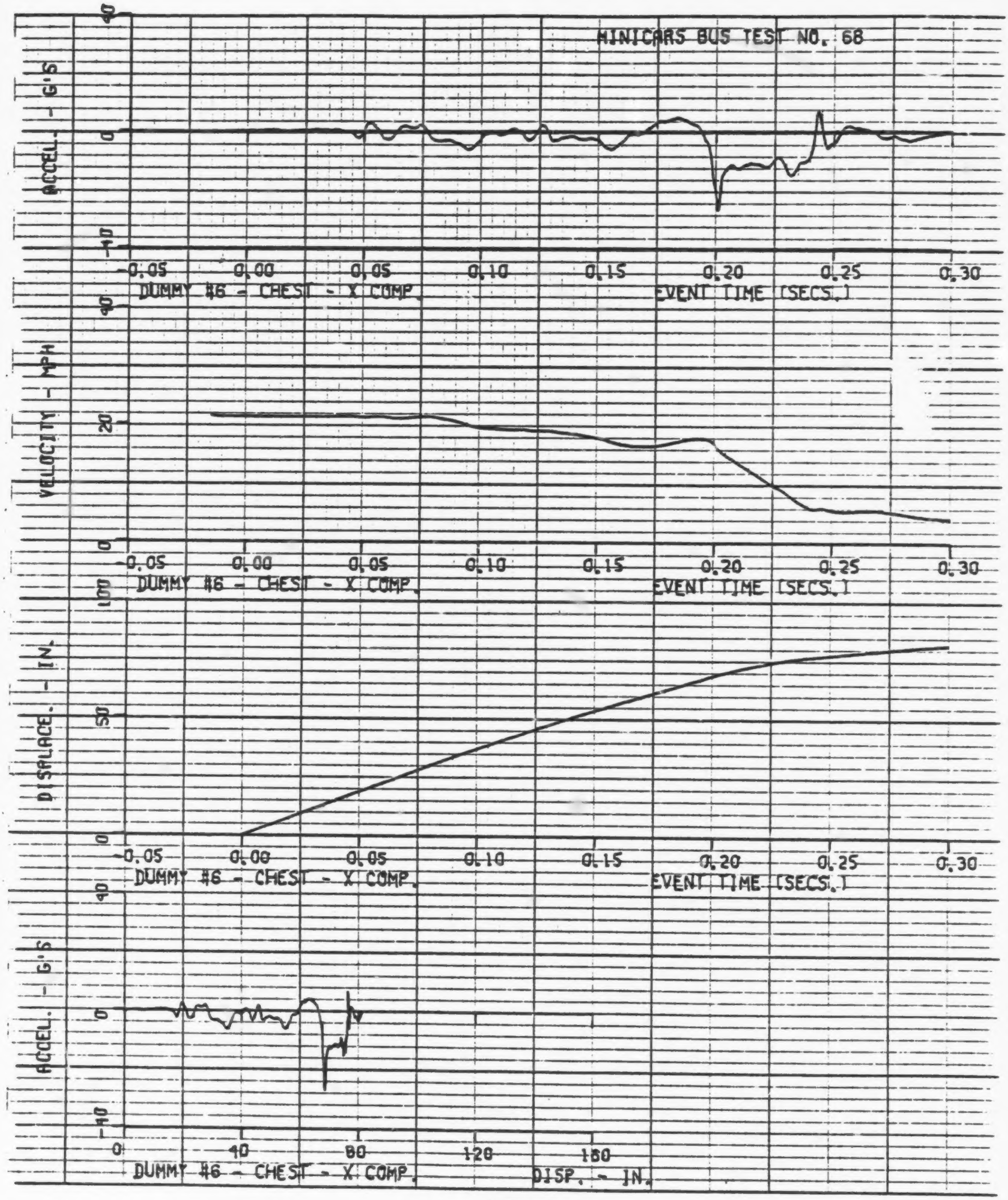
EVENT TIME (SECS.)

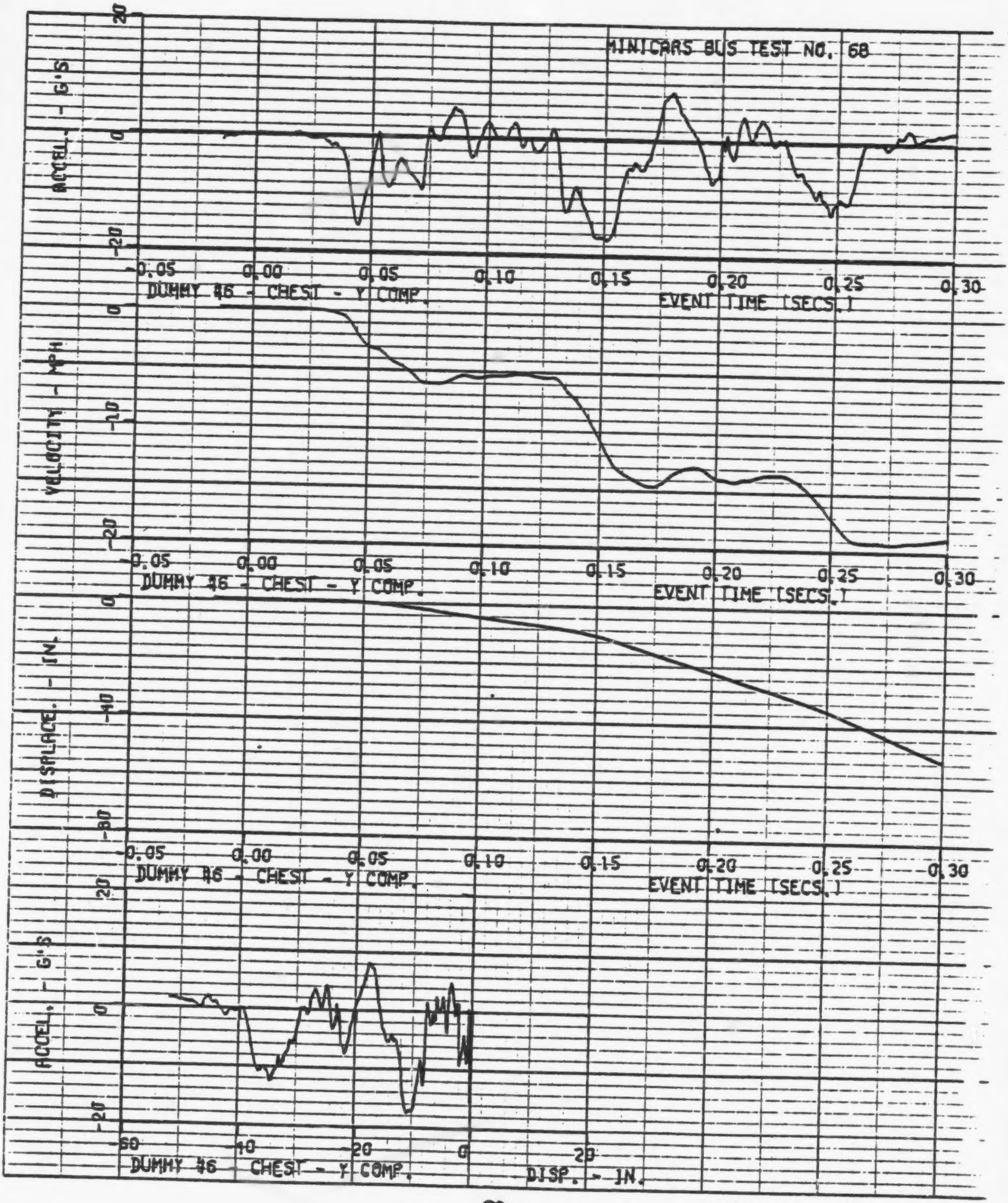
6440-V-4


MINICARS BUS TEST NO. 68
ACCEL. - G'S (X10¹)
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S (X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S (X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD - Z COMP.
EVENT TIME (SECS.)

6440-V-4

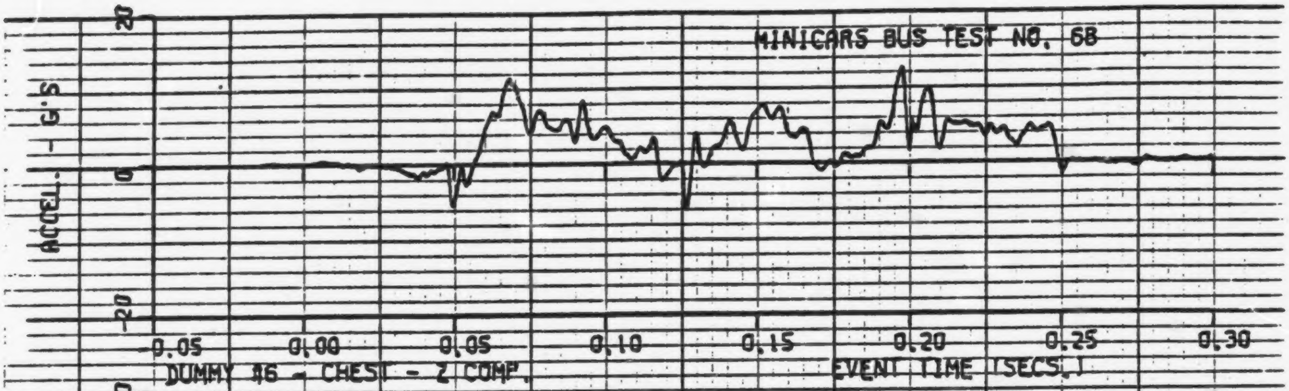

MINICARS BUS TEST NO. 68
ACCEL. - G'S
(X10¹)
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
(X10²)
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD
EVENT TIME (SECS.)

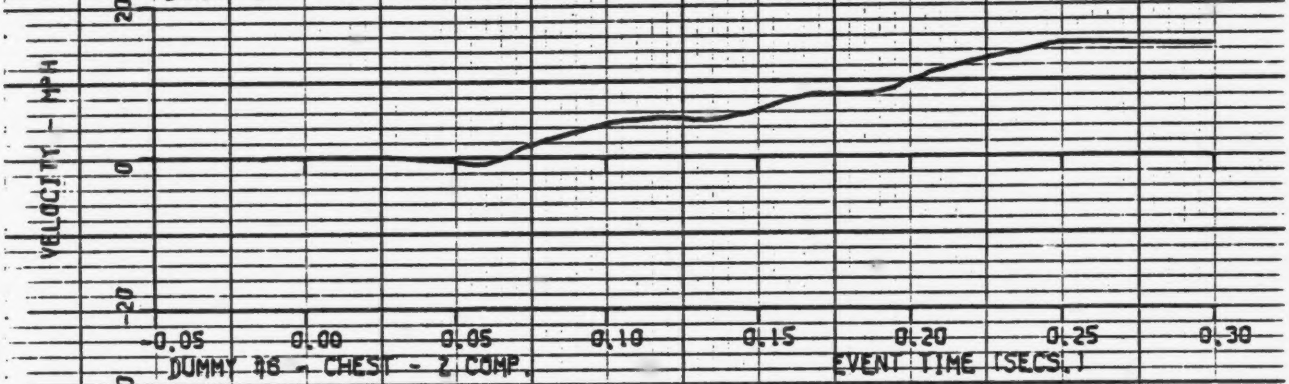

MINICARS BUS TEST NO. 68
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - X COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - X COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
100
50
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
0
40
80
120
160
DUMMY #6 - CHEST - X COMP.
DISP. - IN.

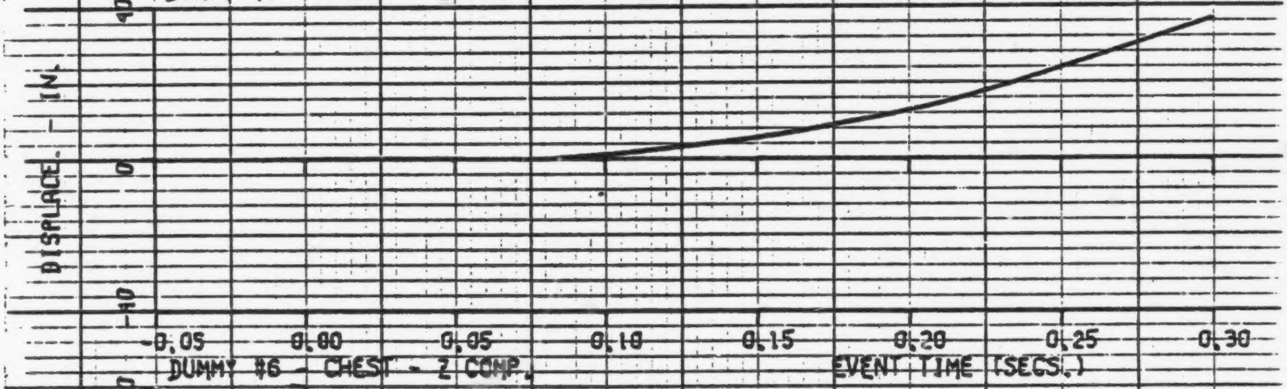

MINICARS BUS TEST NO. 68
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Y COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
0
-10
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Y COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
0
-40
-80
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-60
-40
-20
0
20
DUMMY #6 - CHEST - Y COMP.
DISP. - IN.

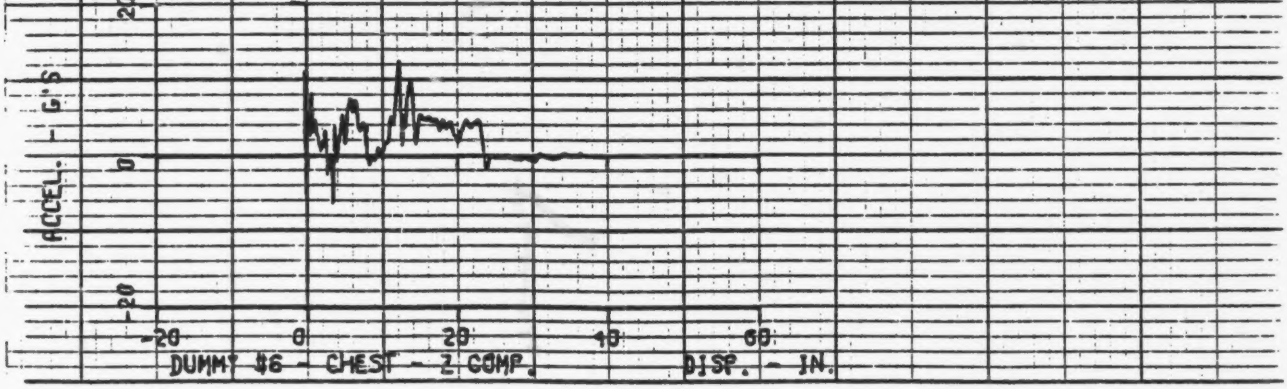
6440-V-4

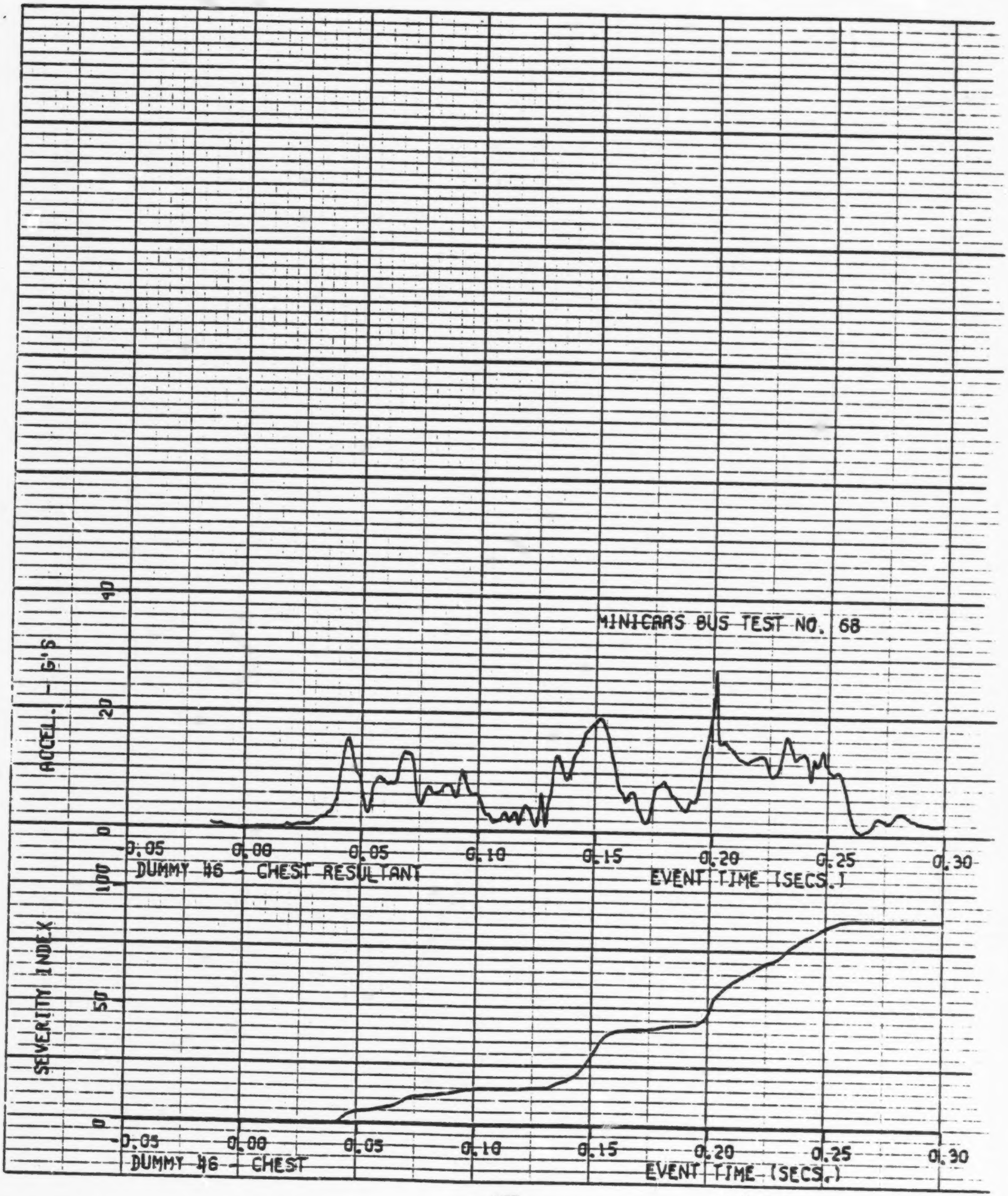
477

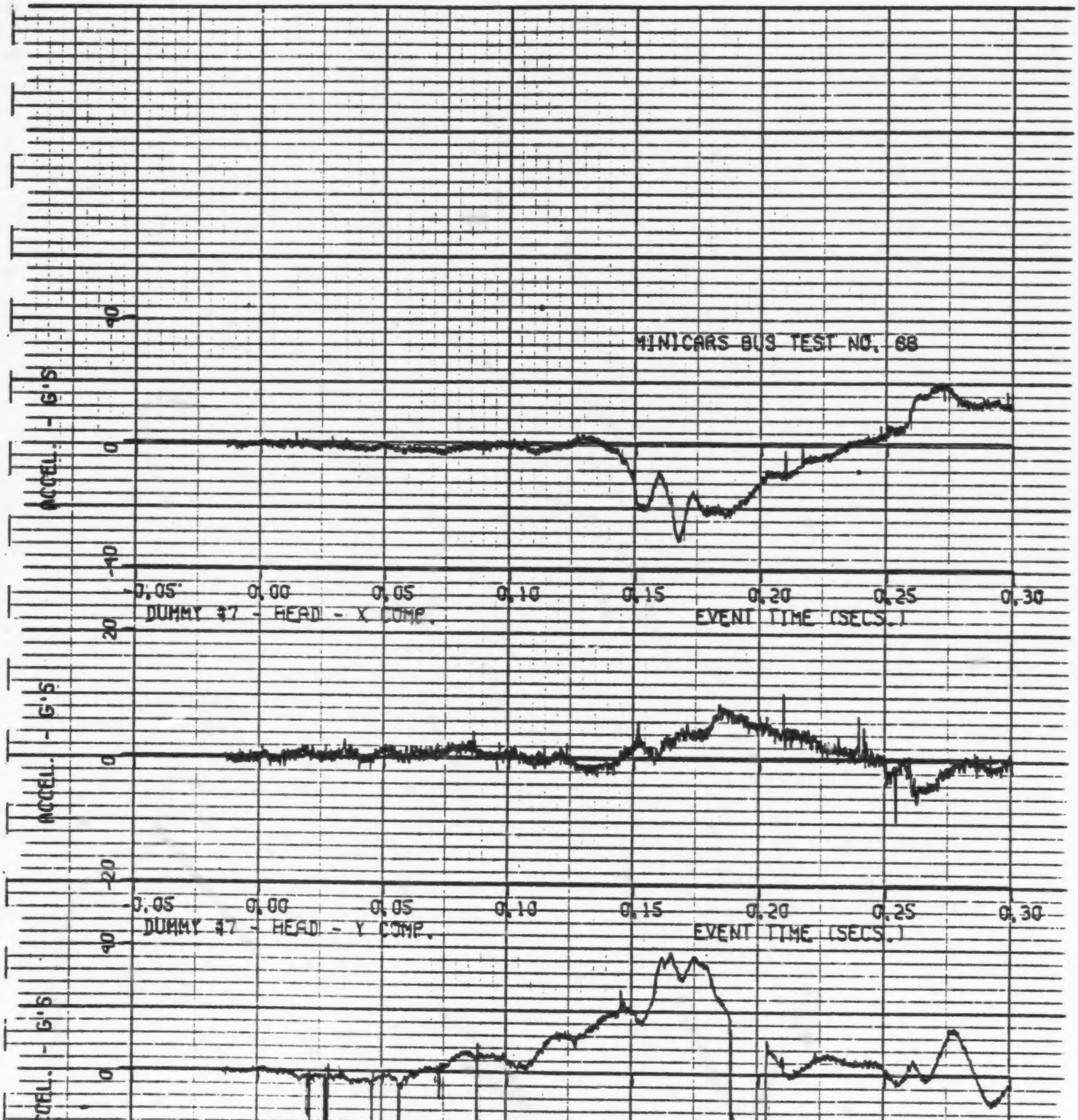

MINICARS BUS TEST NO. 68
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Z COMP.
EVENT TIME (SECS.)


VELOCITY - MPH
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Z COMP.
EVENT TIME (SECS.)

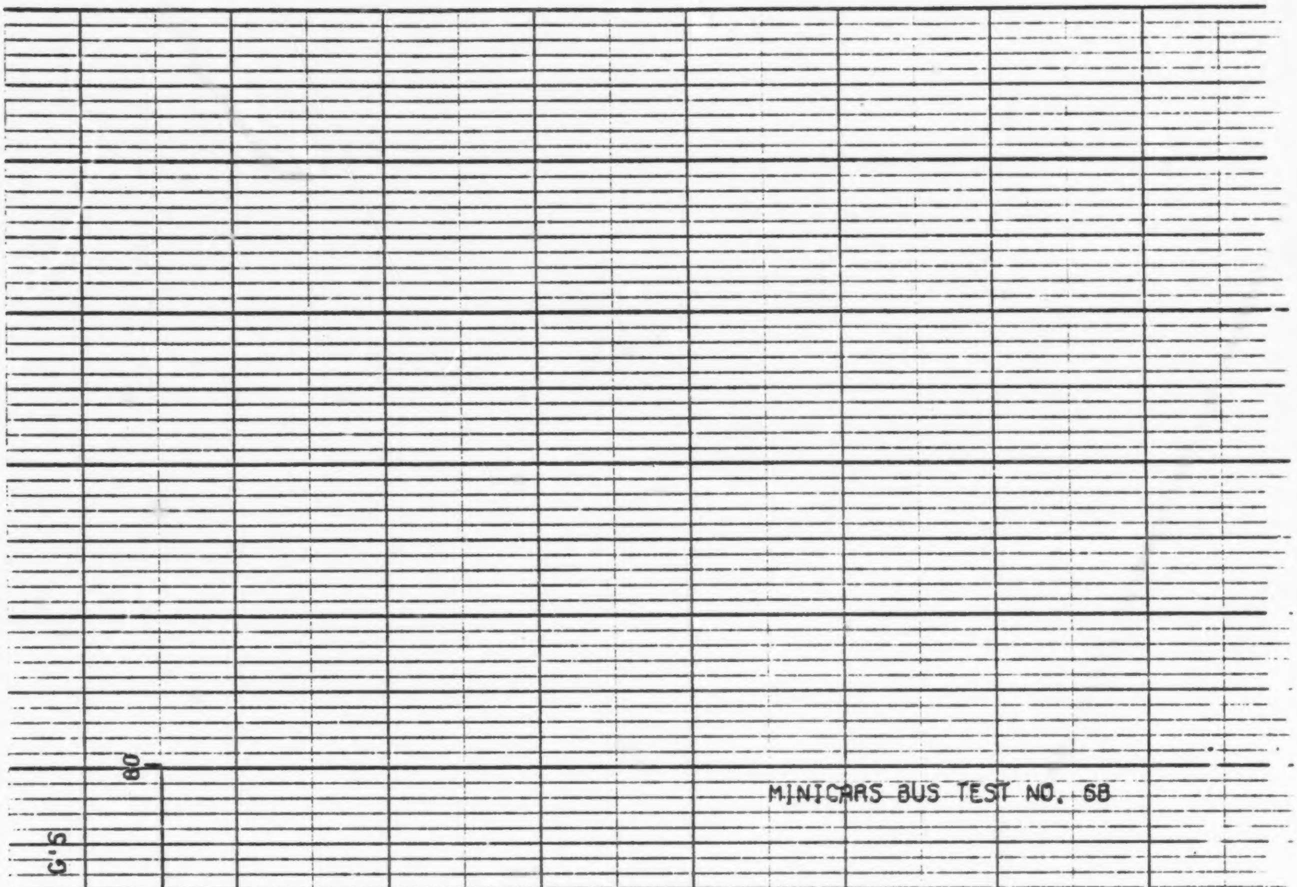

DISPLACE. - IN.
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Z COMP.
EVENT TIME (SECS.)

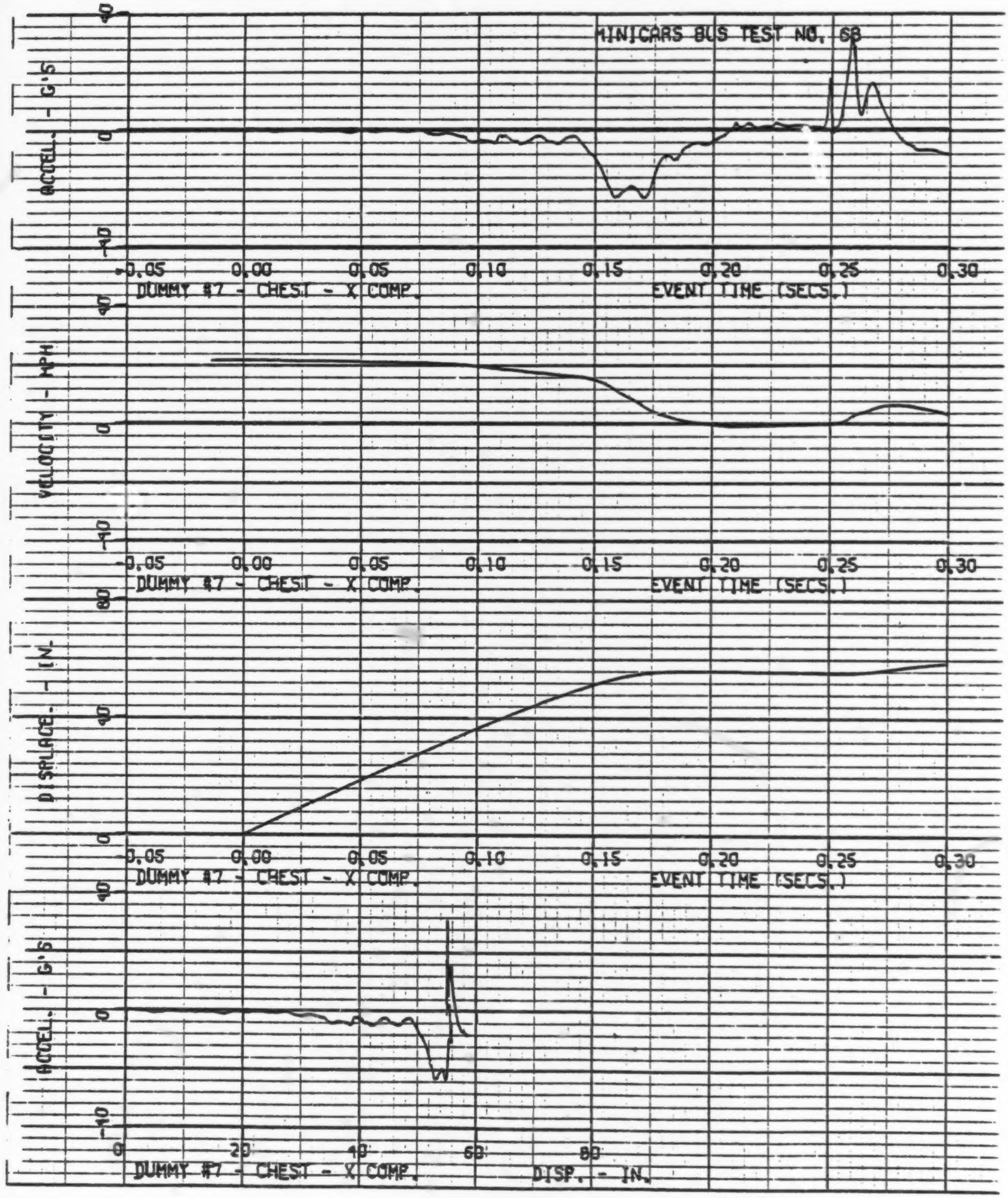

ACCEL. - G'S
20
0
-20
-20
0
20
40
60
DUMMY #6 - CHEST - Z COMP.
DISP. - IN.


MINICARS BUS TEST NO. 68
ACCEL. - G'S
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY 46 - CHEST RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
100
50
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY 46 - CHEST
EVENT TIME (SECS.)

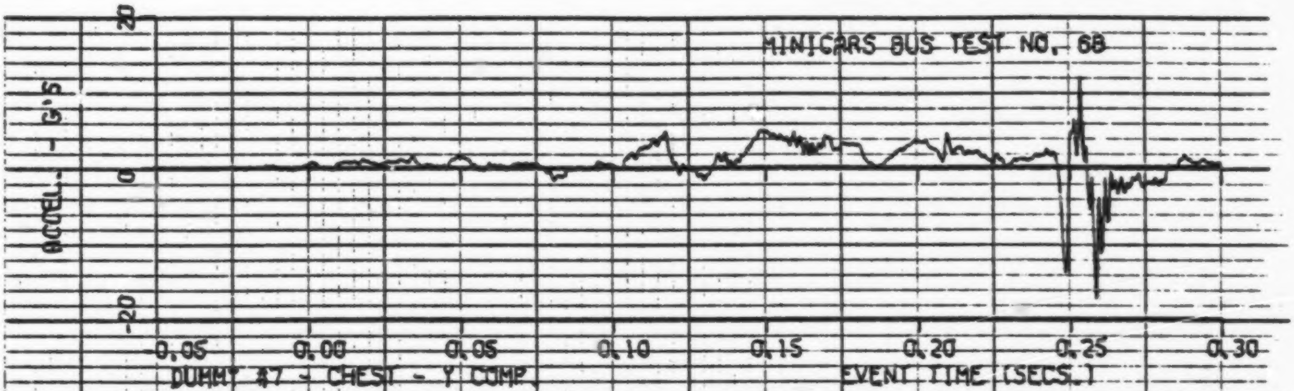

MINICARS BUS TEST NO. 68
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - HEAD - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - HEAD - Y COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - HEAD - Z COMP.
EVENT TIME (SECS.)

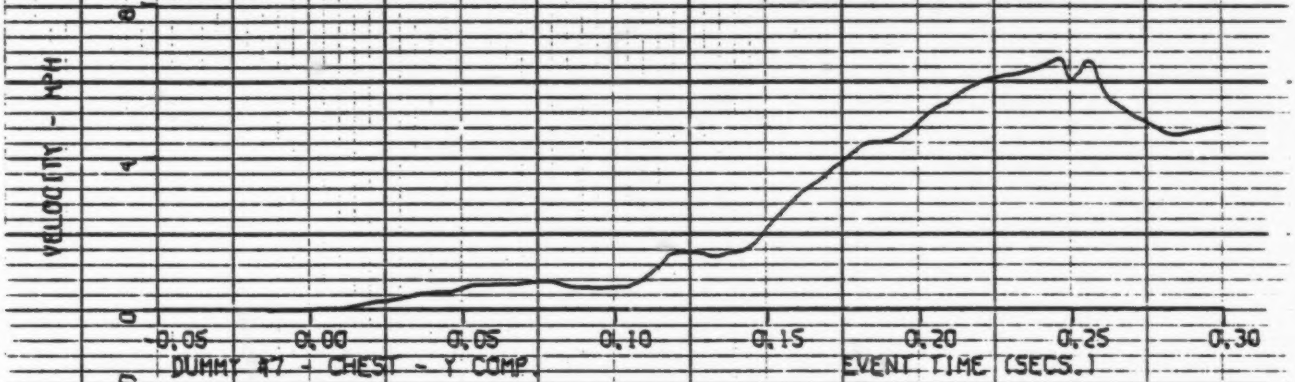
6440-V-4

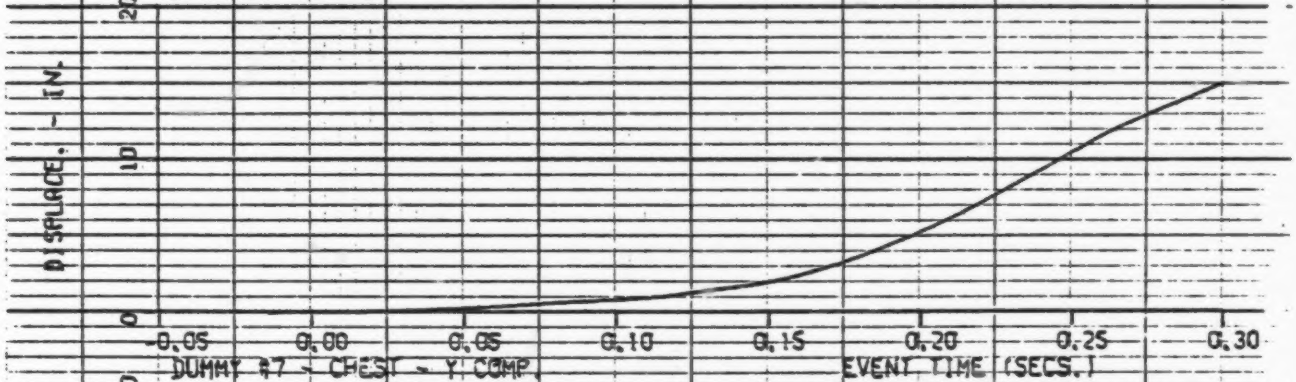

MINICARS BUS TEST NO. 68
ACCEL. - G'S
80
40
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - HEAD RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
(X101)
80
40
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - HEAD
EVENT TIME (SECS.)

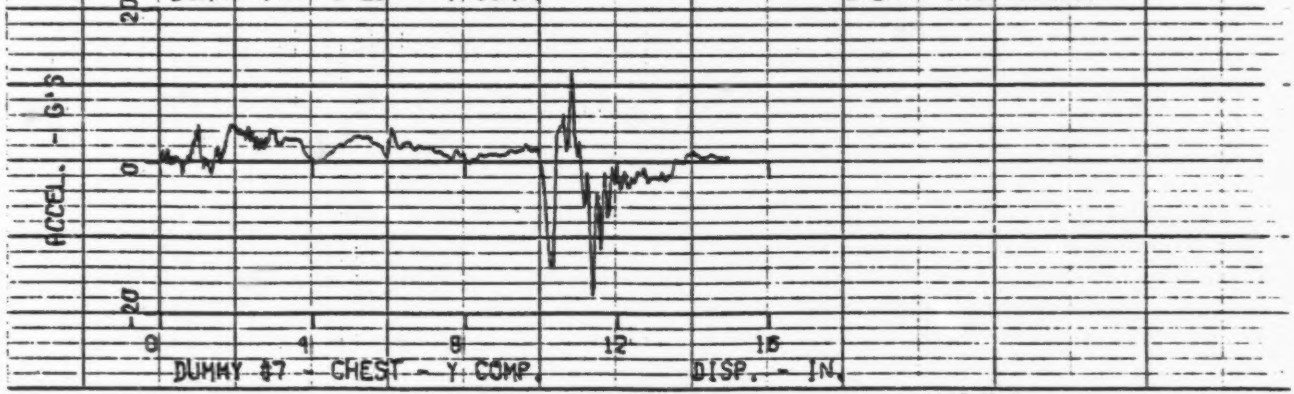

MINICARS BUS TEST NO. 6B
ACCEL. - G'S
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST - X COMP.
EVENT TIME (SECS.)
VELOCITY - MPH
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST - X COMP.
EVENT TIME (SECS.)
DISPLACE. - IN.
80
40
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST - X COMP.
EVENT TIME (SECS.)
ACCEL. - G'S
40
0
-40
0
20
40
60
80
DUMMY #7 - CHEST - X COMP.
DISP. - IN.

6440-V-4

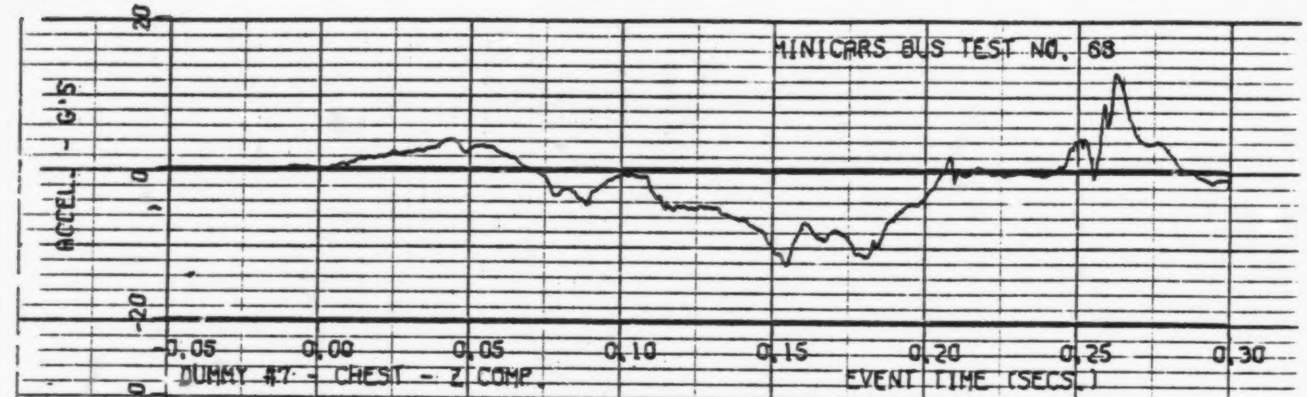

MINICARS BUS TEST NO. 68
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST - Y COMP.
EVENT TIME (SECS.)

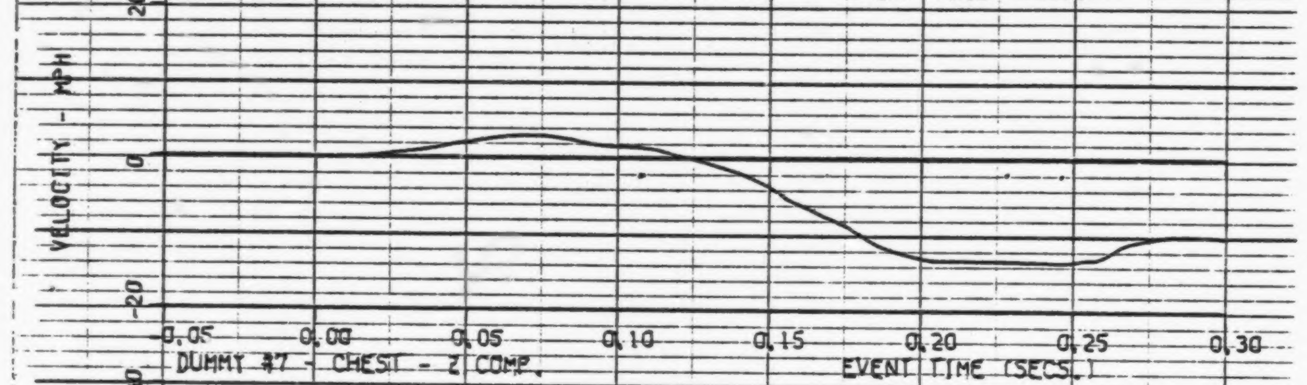

VELOCITY - MPH
8
4
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST - Y COMP.
EVENT TIME (SECS.)

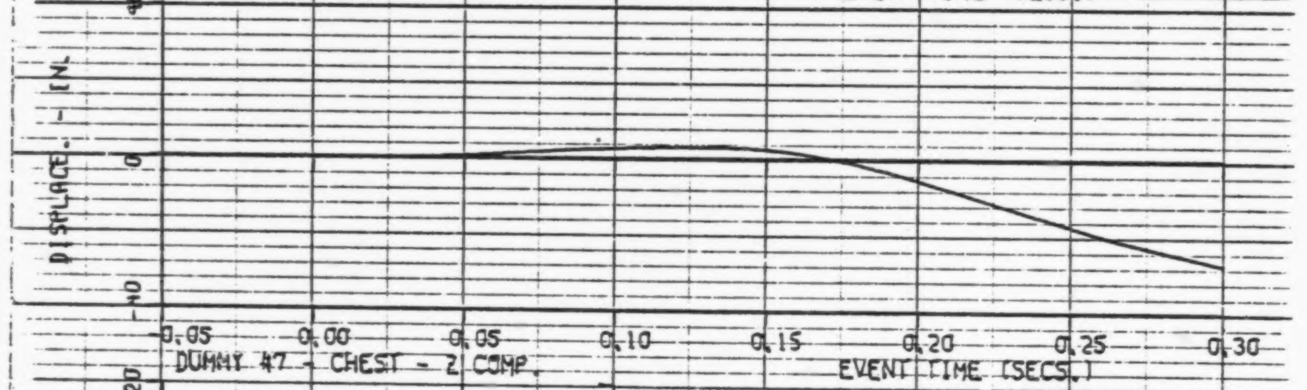

DISPLACE. - IN.
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST - Y COMP.
EVENT TIME (SECS.)

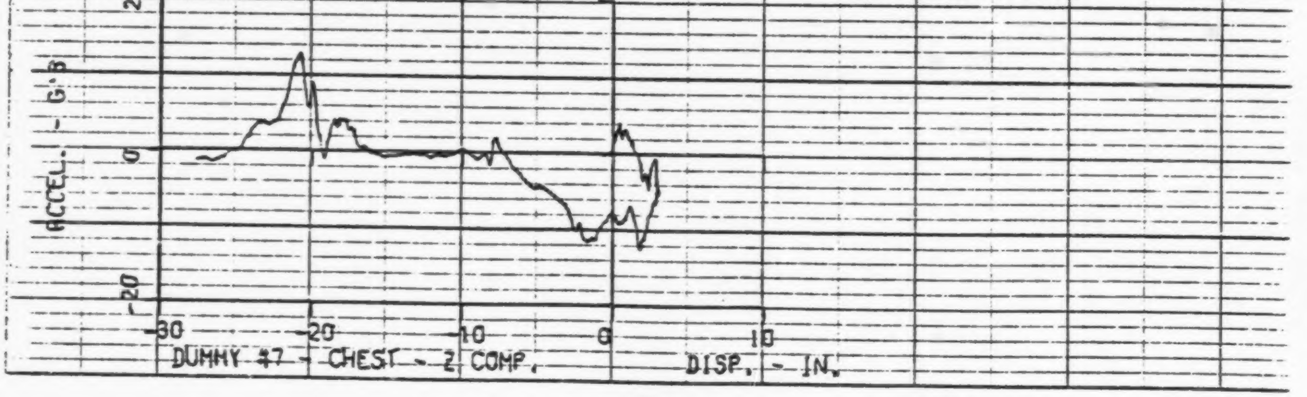

ACCEL. - G'S
20
0
-20
0
4
8
12
16
DUMMY #7 - CHEST - Y COMP.
DISP. - IN.

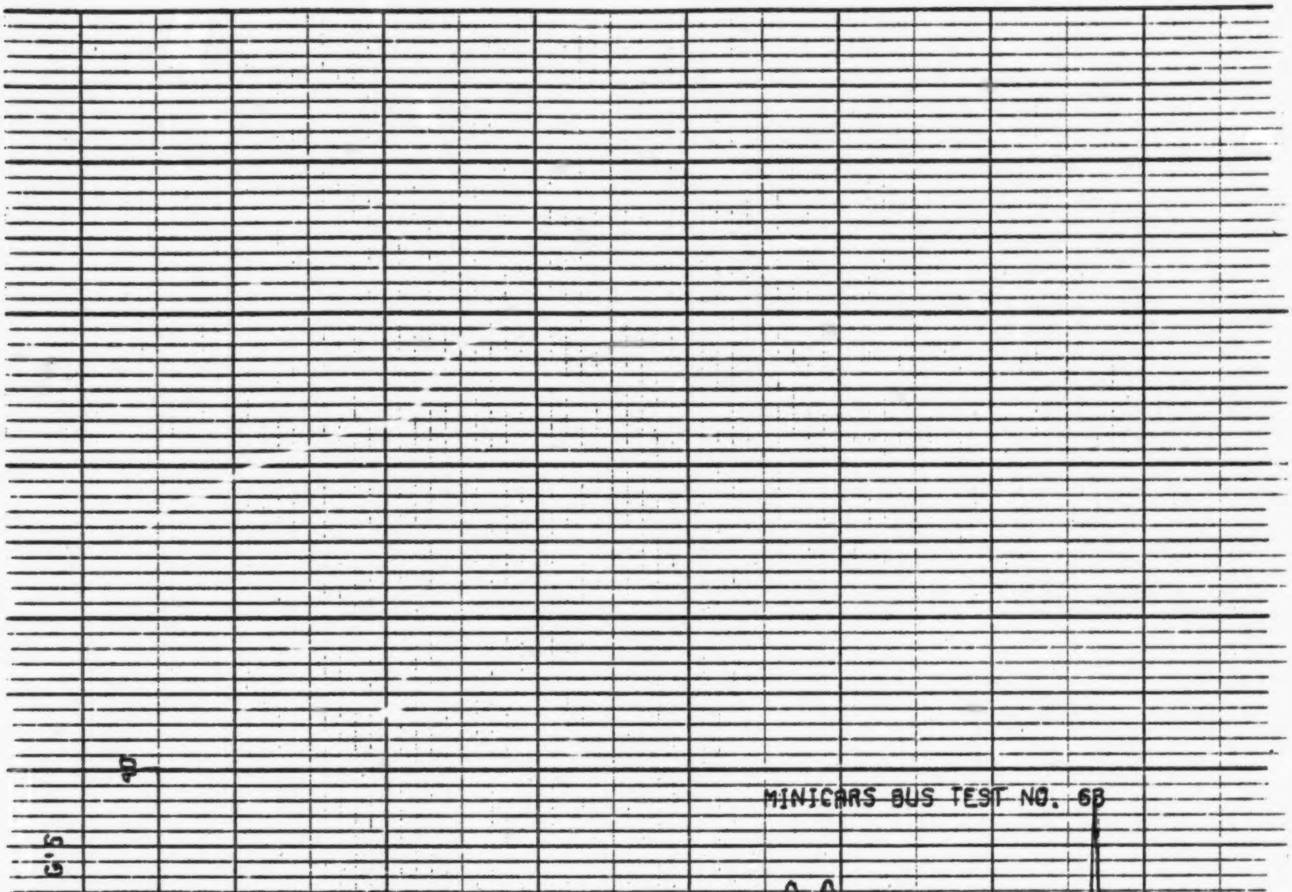
6440-V-4


MINICARS BUS TEST NO. 68
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST - Z COMP.
EVENT TIME (SECS.)

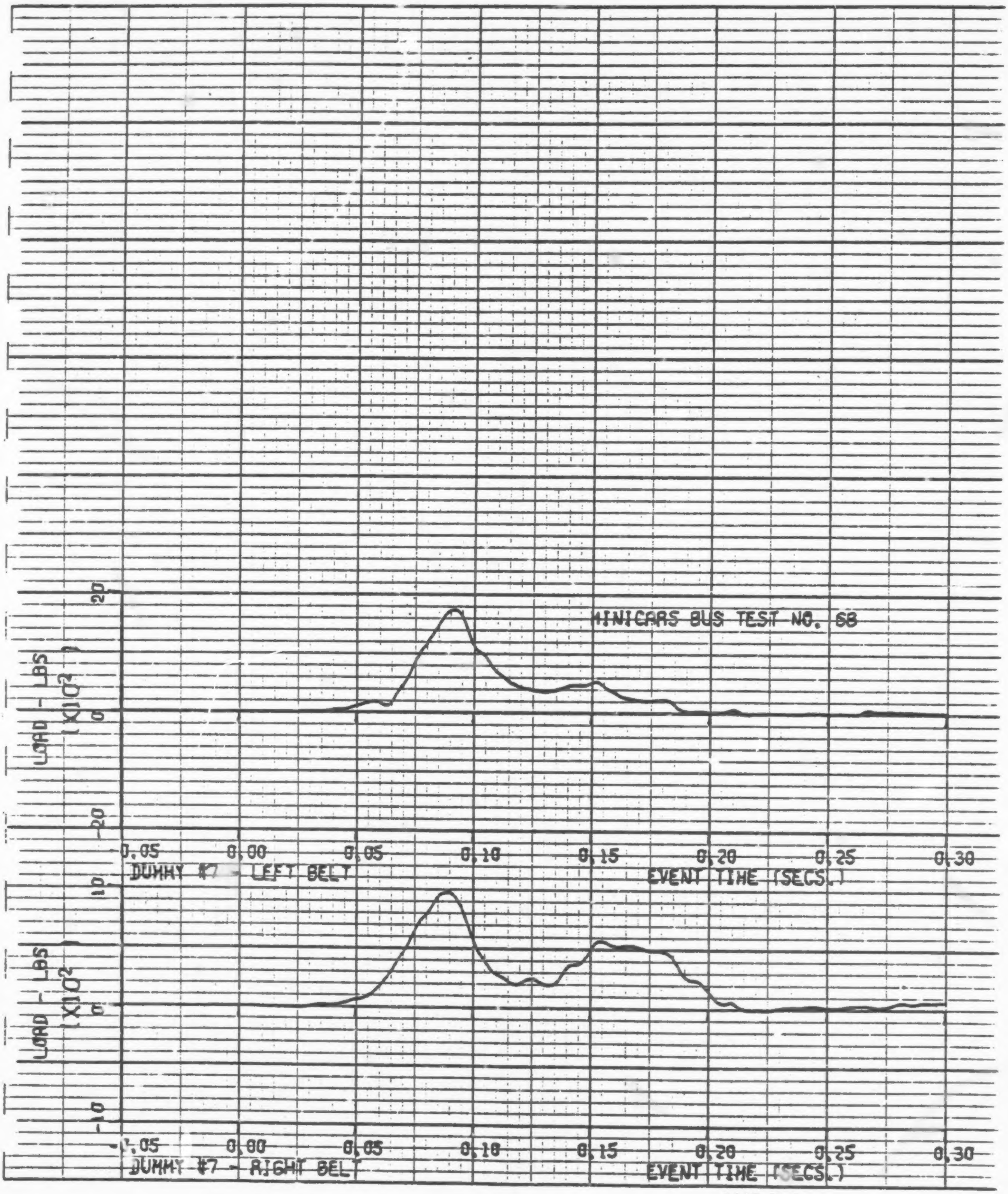

VELOCITY - MPH
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST - Z COMP.
EVENT TIME (SECS.)


DISPLACE. - IN.
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST - Z COMP.
EVENT TIME (SECS.)


ACCEL. - G'S
20
0
-20
-30
-20
-10
0
10
DUMMY #7 - CHEST - Z COMP.
DISP. - IN.


MINICARS BUS TEST NO. 6B
ACCEL. - G'S
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST RESULTANT
EVENT TIME (SECS.)
SEVERITY INDEX
(X10¹)
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST
EVENT TIME (SECS.)

6440-V-4


MINICARS BUS TEST NO. 6B
LOAD - LBS (X10²)
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - LEFT BELT
EVENT TIME (SECS.)
LOAD - LBS (X10²)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - RIGHT BELT
EVENT TIME (SECS.)

6440-V-4

Table 9

CRASH TEST SUMMARY

TEST NO. 7 PROJECT MINICARS BUS TEST

DATE 3/22/79 TIME 2:55pm TEMP. 68°F

TEST CONDITION MOVING BARRIER TEST

VEHICLE NO. 1 1971 FORD LTD

VEHICLE NO. 2 CROWN COACH BUS

	VEH. NO. 1	VEH. NO. 2
TEST WEIGHT (lbs)	5030	27460
IMPACT ANGLE (deg)*		0
IMPACT VELOCITY (mph)**	0	53.18
MAX. CRUSH (in)		---
MAX. INTRUSION (in)		

DUMMIES	VEH. NO. 1	VEH. NO. 2
TYPE	5 - 50% 2 6-YEAR OLD CHILD DUMMIES	
LOCATION	SEE FIGURE 27	
RESTRAINT	SEE FIGURE 27	

NUMBER OF DATA CHANNELS 69

NUMBER OF HIGH SPEED CAMERAS 12

---

*WITH RESPECT TO TOW TRACK CENTERLINE

**SPEED TRAP MEASUREMENT (±0.5% ACCURACY)

GENERAL COMMENTS - TEST NO. 7

Wheelchair tie-downs performed satisfactorily.

Bullet vehicle (Ford LTD) underrode bus approximately 8 feet.

No apparent floor buckling.

Table 10

DUMMY INJURY CRITERIA VALUES

BUS TEST NO. 7

	MAXIMUM ACCELERATION (G)*								SEVERITY INDEX	
	X	Y	Z	R	X	Y	Z	R	HEAD	CHEST
DUMMY (2)	-30	-7	-10	40	7.8	-2.5	-3.2	7.8	84	6.6
DUMMY (3)	3	4	3.5	8	2.2	8	2.6	9	7.2	6
DUMMY (4)	-14	24	5.5	28	1.8	6.5	1.7	6.5	28	2.6
DUMMY (5)	-1.5	1	-3	3.3	-.7	-.5	-2.4	2.5	.9	.72
DUMMY (6)	-1.2	-1.2	2	2.4	-.8	-1.2	-2.4	2.8	.6	1
DUMMY (7)	**	6	**	**	-1.2	2.8	-4.3	4.8	**	

	MAXIMUM FORCE - SEAT BELT LOADS (LBS)	
	RIGHT BELT LOADS	LEFT BELT LOAD
DUMMY (2)	*	*
DUMMY (7)	240	310

	MAXIMUM FORCE - FEMUR LOADS (LBS)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY 3	60	80
DUMMY 5	40	44

	HIC	HEAD INJURY CRITERIA		AVE. ACC. (G) t_1 TO t_2
		t_1 (SEC)	t_2 (SEC)	
DUMMY (2)	64.1	.157	.159	53.1
DUMMY (3)	5.46	.066	.164	5.01
DUMMY (4)	21.8	.105	.110	28.9
DUMMY (5)	.631	.027	.299	1.39
DUMMY (6)	.451	.016	.295	1.21
DUMMY (7)	140	.017	.299	11.9

*UNREALISTIC BELT LOADS

**SIGNAL CONTAINS SHIFTS IN LEVEL

Table 11

TEST NO. 7 BUS & AUTOMOBILE TEST WEIGHTS

BUS TEST WEIGHTS:

LEFT FRONT = 6310 LBS
RIGHT FRONT = 4810 LBS
TOTAL FRONT 11,120 LBS

LEFT REAR = 8290 LBS
RIGHT REAR = 8050 LBS
TOTAL REAR 16,340 LBS

TOTAL WEIGHT = 11,120 LBS + 16,340 LBS = 27,460 LBS

WHEEL BASE = 258 INCHES

$$Cg_{FW} = \frac{16340 \times 258}{27460} = 153.52 \text{ INCHES}$$

1971 FORD LTD TEST WEIGHTS:

LEFT FRONT = 1440 LBS
RIGHT FRONT = 1410 LBS
TOTAL FRONT = 2850 LBS

LEFT REAR = 1100 LBS
RIGHT REAR = 1080 LBS
TOTAL REAR = 2180 LBS

TOTAL WEIGHT = 2850 LBS + 2180 LBS = 5030 LBS

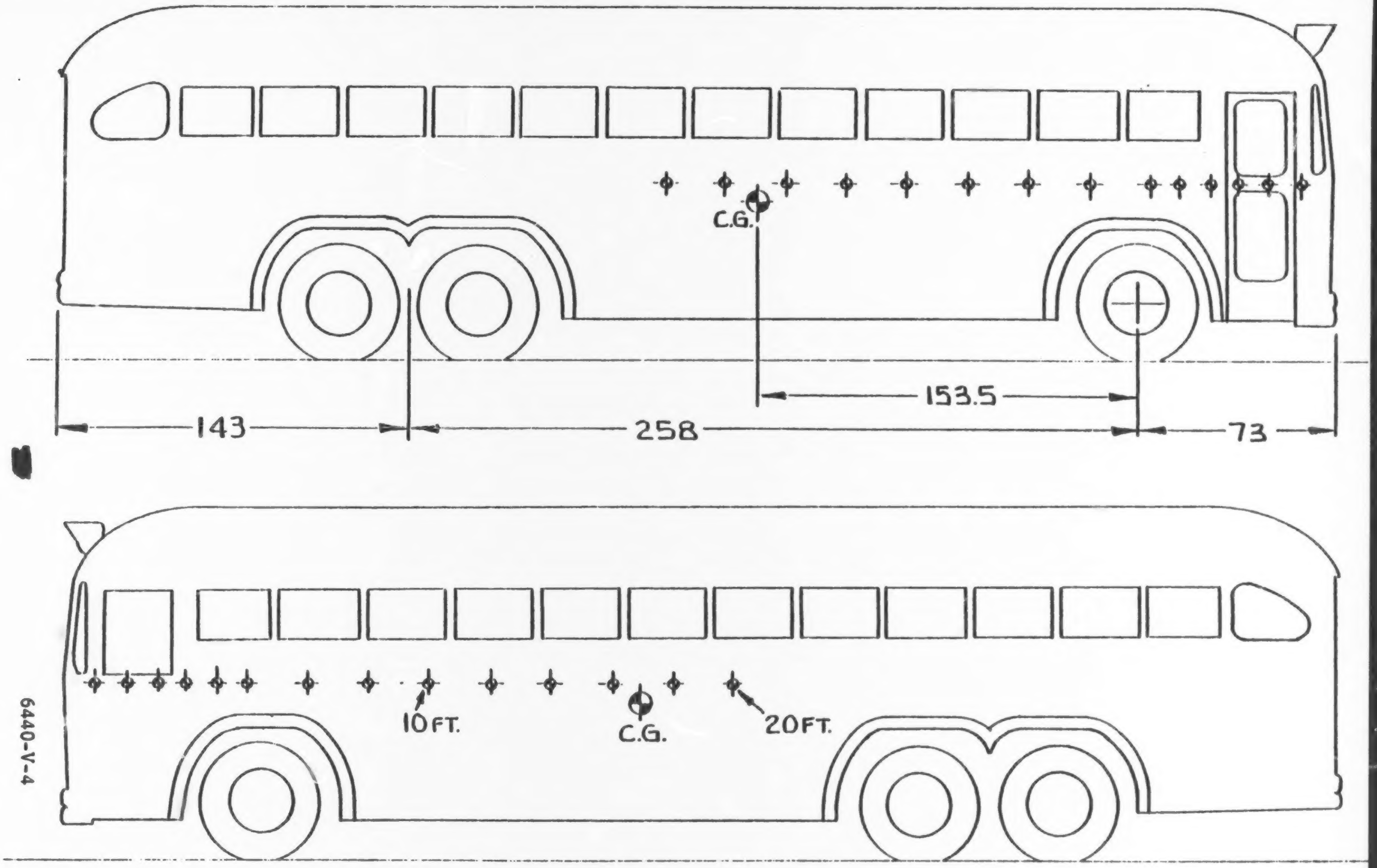

C.G.
153.5
143
258
73
10 FT.
C.G.
20 FT.
6440-V-4

FIGURE 21 TEST NO. 7, VEHICLE DIMENSIONS & PHOTOGRAPHIC TARGETS

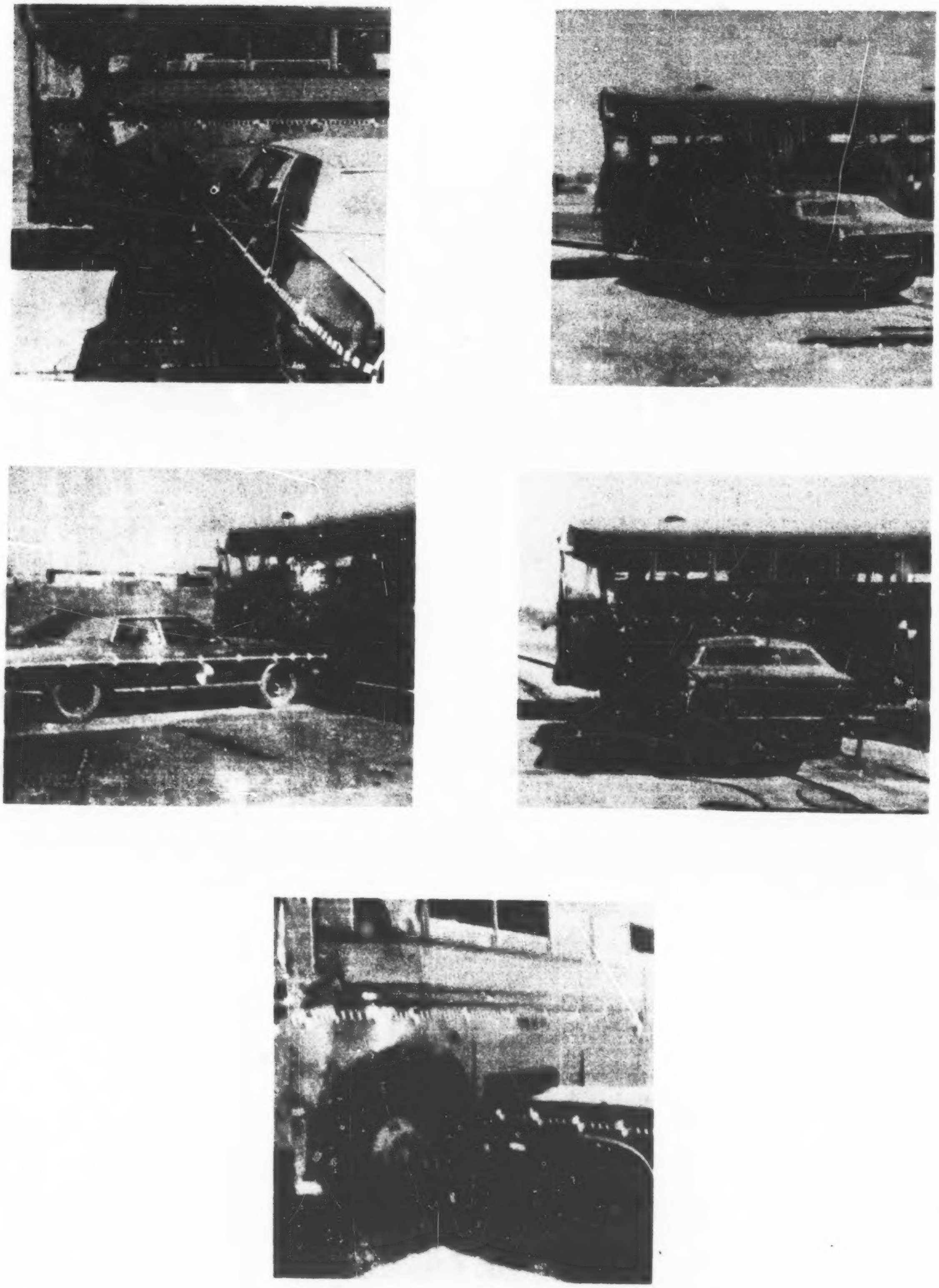


Figure 22 PRE-TEST NO. 7 EXTERIOR VIEWS

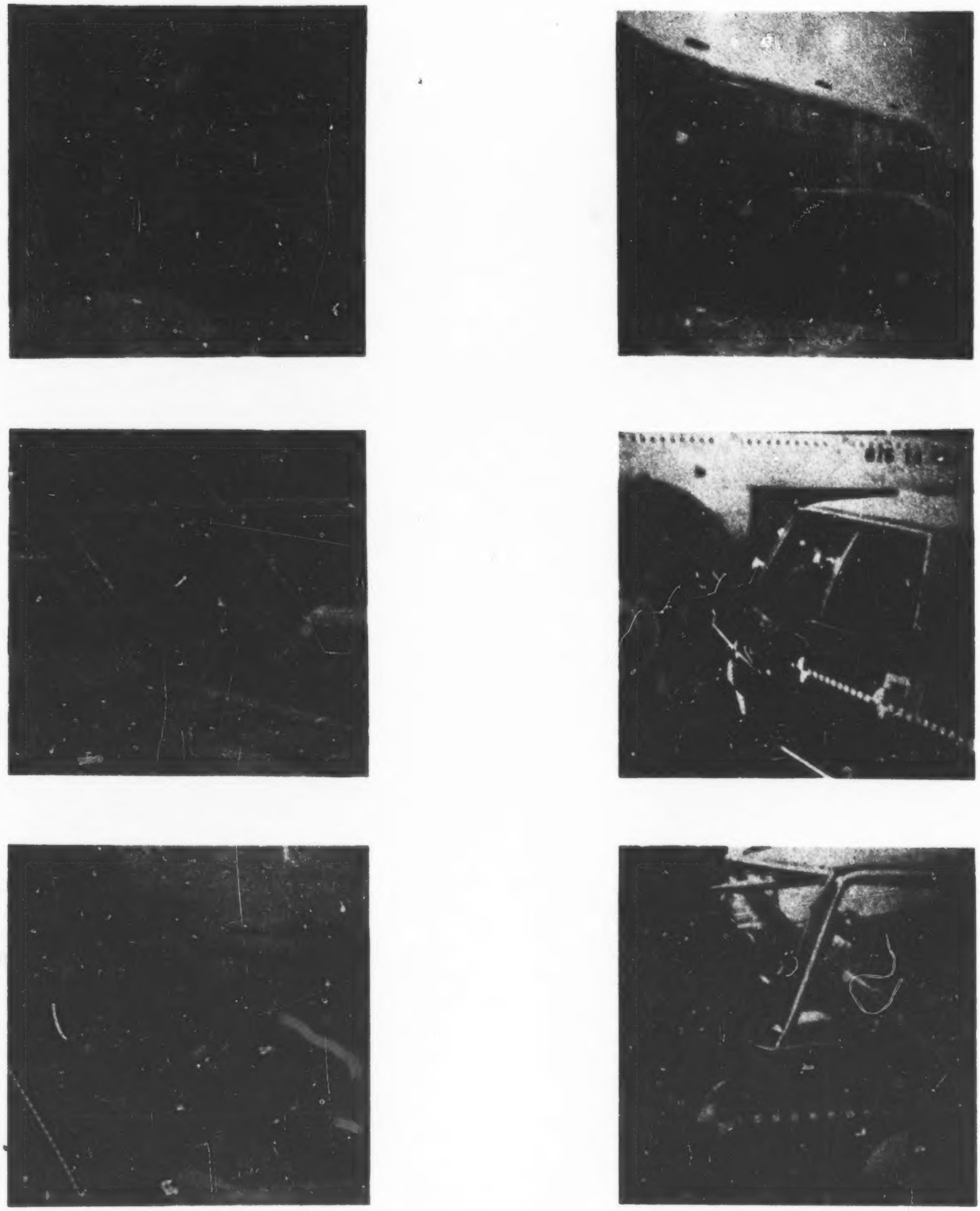


Figure 23 POST-TEST NO. 7 EXTERIOR VIEWS

6440-V-4

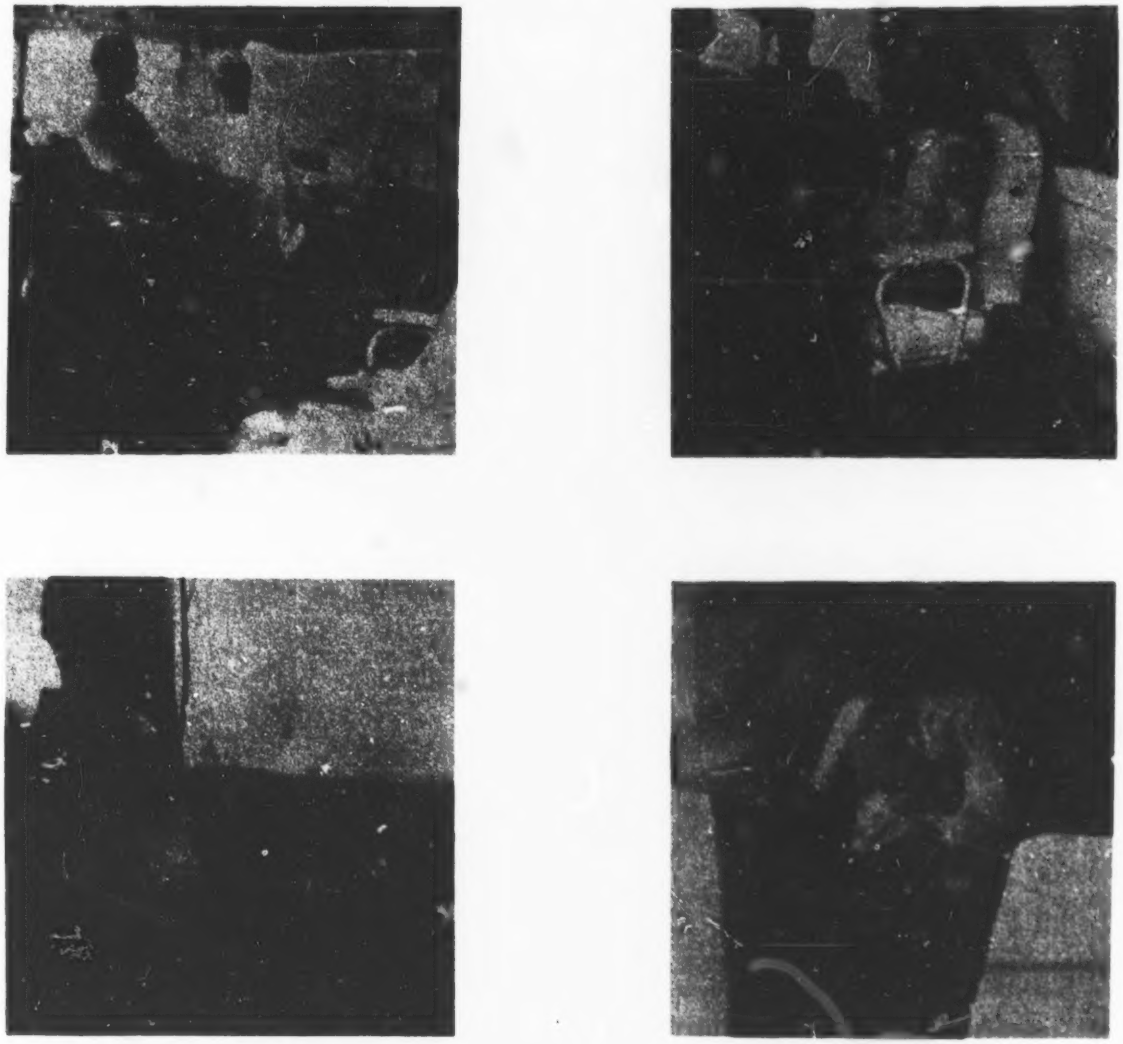


Figure 24 PRE-TEST NO. 7 INTERIOR VIEWS

6440-V-4

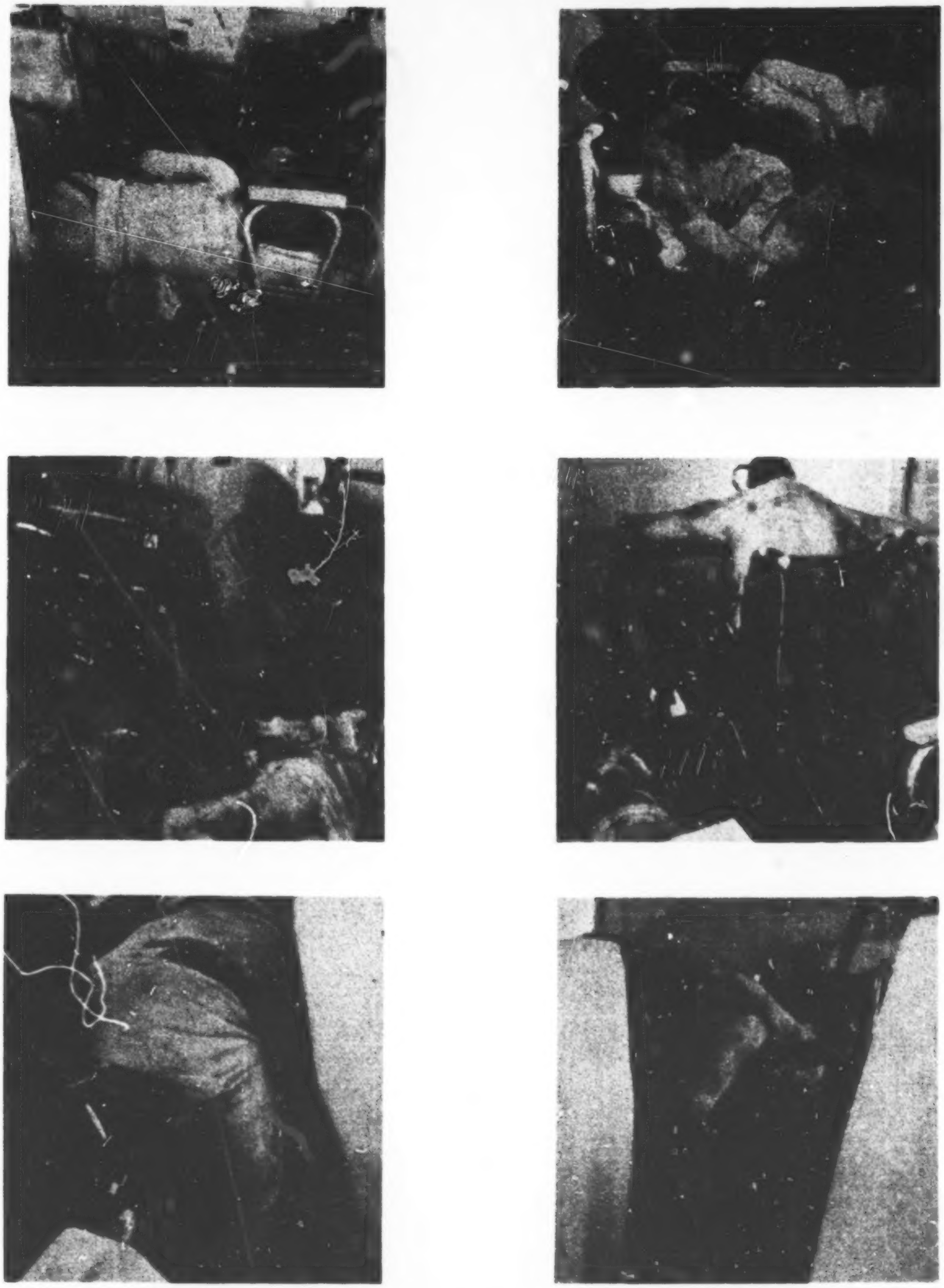
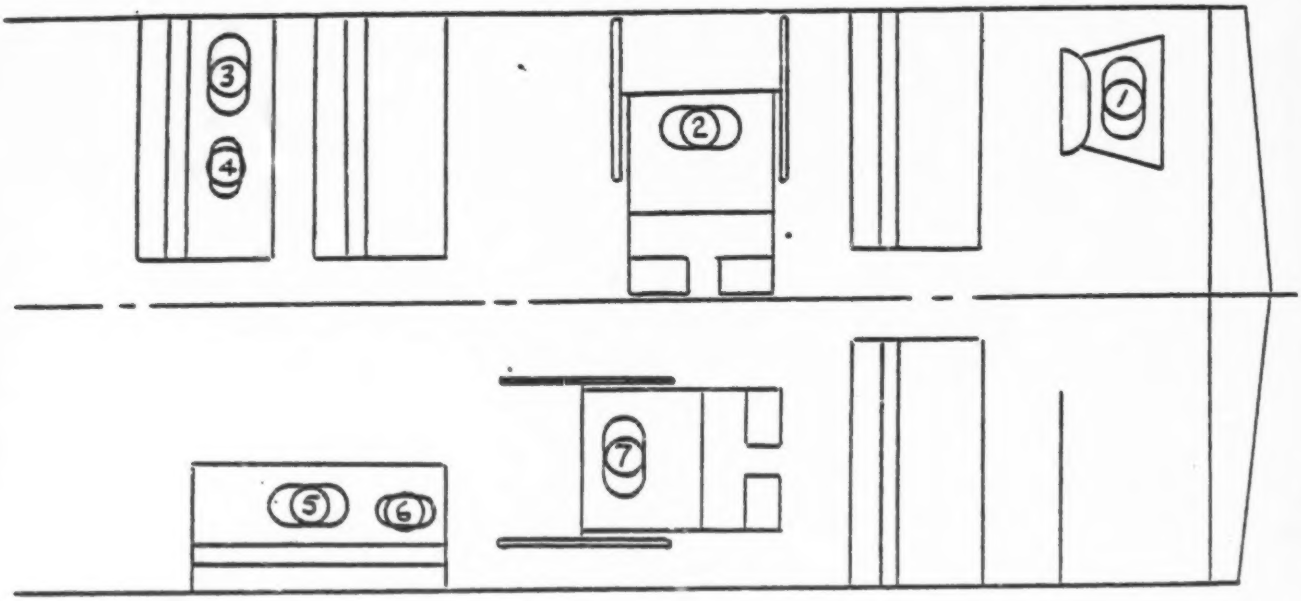
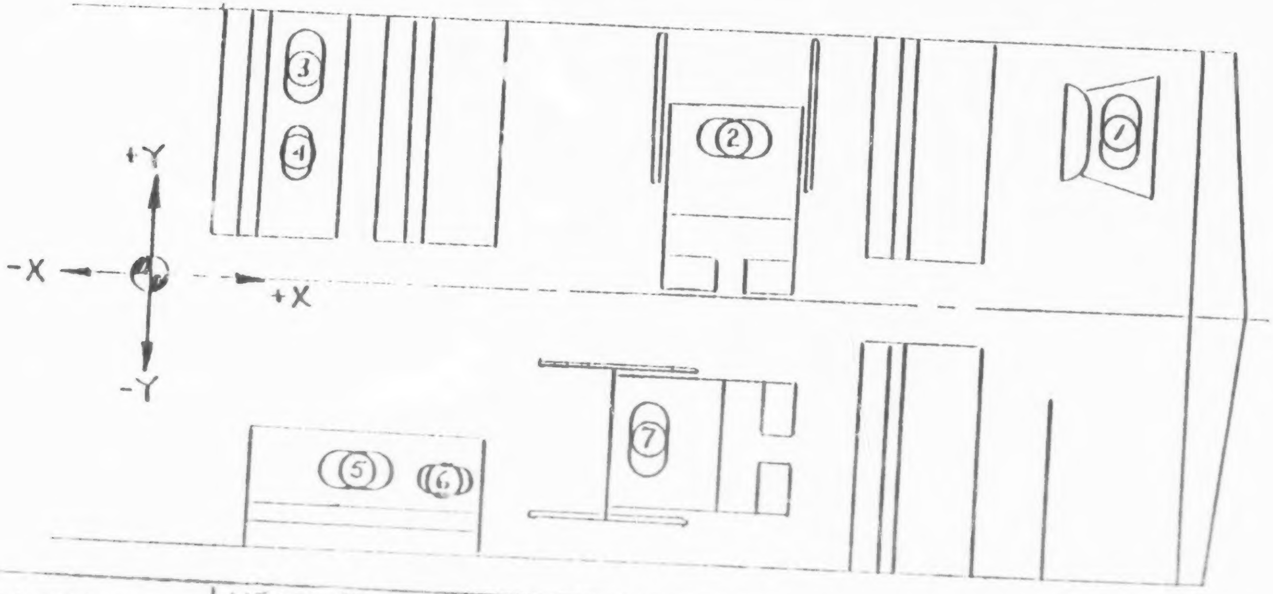


Figure 25 POST-TEST NO. 7 INTERIOR VIEWS



DUMMY POS. & TYPE	TRANDSUCERS HEAD ACCEL.	CHEST ACCEL.	FEMUR LOAD	BELT LOAD
1 50%	X, Y, Z	X, Y, Z	--	RIGHT & LEFT
2 50%	X, Y, Z	X, Y, Z	--	RIGHT & LEFT
3 50%	X, Y, Z	X, Y, Z	RIGHT & LEFT	--
4 6-YR OLD	X, Y, Z	X, Y, Z	--	--
5 50%	X, Y, Z	X, Y, Z	RIGHT & LEFT	--
6 6-YR OLD	X, Y, Z	X, Y, Z		--
7 50%	X, Y, Z	X, Y, Z		RIGHT & LEFT

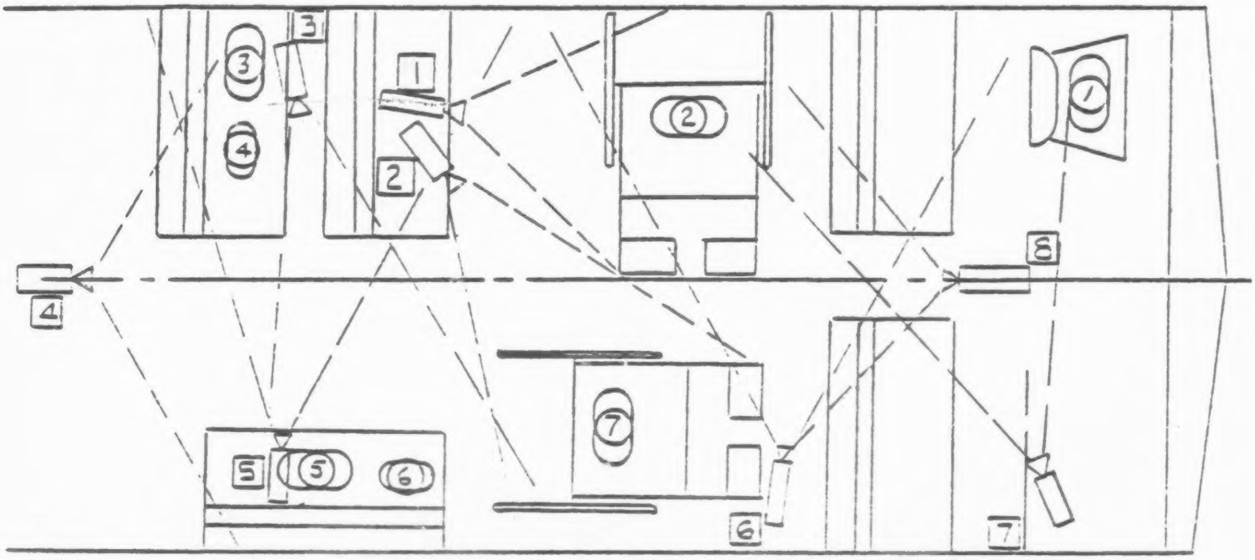
FIGURE 26 TEST NO. 7, DUMMY SEATING POSITION AND INSTRUMENTATION



DUMMY POSITION		HEAD POINT (INCHES)			H POINT (INCHES)			KNEE POINT (INCHES)		
		X	Y	Z	X	Y	Z	X	Y	Z
(1)	PRE	114½	-30	44½	148½	-25½	18	165½	-24¾	22¾
	POST	149½	30	17½	174¼	10¾	15½	171¼	-18¾	1½
(2)	PRE	112	-32¾	48	108	-29¾	21	110	-10¾	23
	POST	121½	-2¾	23¾	117½	-24¾	23½	118	11¾	17½
(3)	PRE	39	-30½	44	37	-26½	19	51¾	-27¼	20½
	POST	39	25¾	17	28	-1½	10½	54	-2¼	8¼
(4)	PRE	36½	-18¼	35½	37	-16½	17	46	-17¾	18
	POST	31¼	18	6½	41	-1	0	51¾	-1½	0
(5)	PRE	50½	34½	44	44¼	31¾	18½	45	15¼	20
	POST	54½	30½	31	53¼	12¼	8½	50½	-1¼	19¼
(6)	PRE	66¾	35¼	38	64¾	29½	18	64	19½	19½
	POST	116½	7¾	8½	96½	4¼	7½	88¼	-3	6¼
(7)	PRE	103	25¼	48	100½	18½	21	118	20½	24
	POST	117½	27½	37¼	104½	17½	21½	118½	20	20½

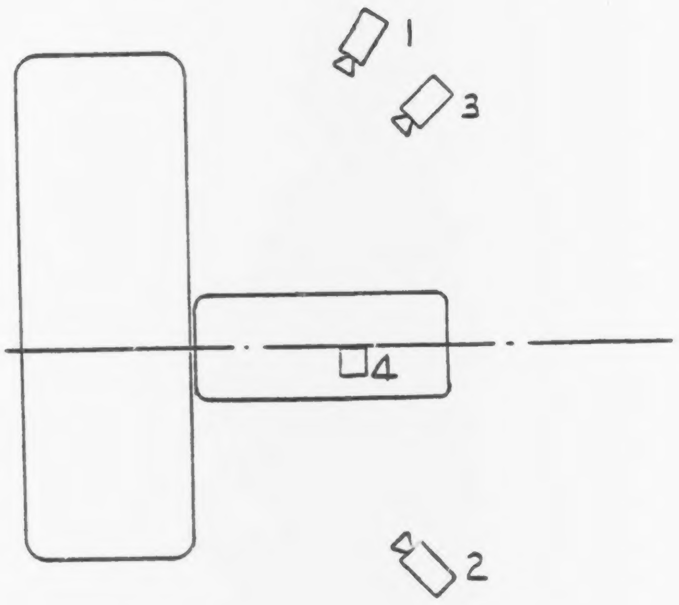
FI 27 UMM CAT PR AND T-TI NO.

6140-V-4



LOCATION NO.	TYPE	LENS (MM)	SPEED (FPS)
1	PHOTOSONIC	8	500
2	PHOTOSONIC	8	400
3	STALEX	8	400
4	STALEX	8	500
5	STALEX	8	450
6	STALEX	8	500
7	STALEX	8	500
8	STALEX	8	500

FIGURE 28 ON-BOARD CAMERA COVERAGE FOR TEST NO. 7



LOC. NO.	LOCATION	CAMERA TYPE	LENS (MM)	SPEED (FPS)
1	SOUTH WEST	PHOTOSONIC	13	700
2	NORTH WEST	PHOTOSONIC	13	500
3	TOWER 45°	PHOTOSONIC	13	500
4	TOWER	PHOTOSONIC	13	600

FIGURE 29 OFF-BOARD CAMERA COVERAGE FOR TEST NO. 7

500

6410-V-1

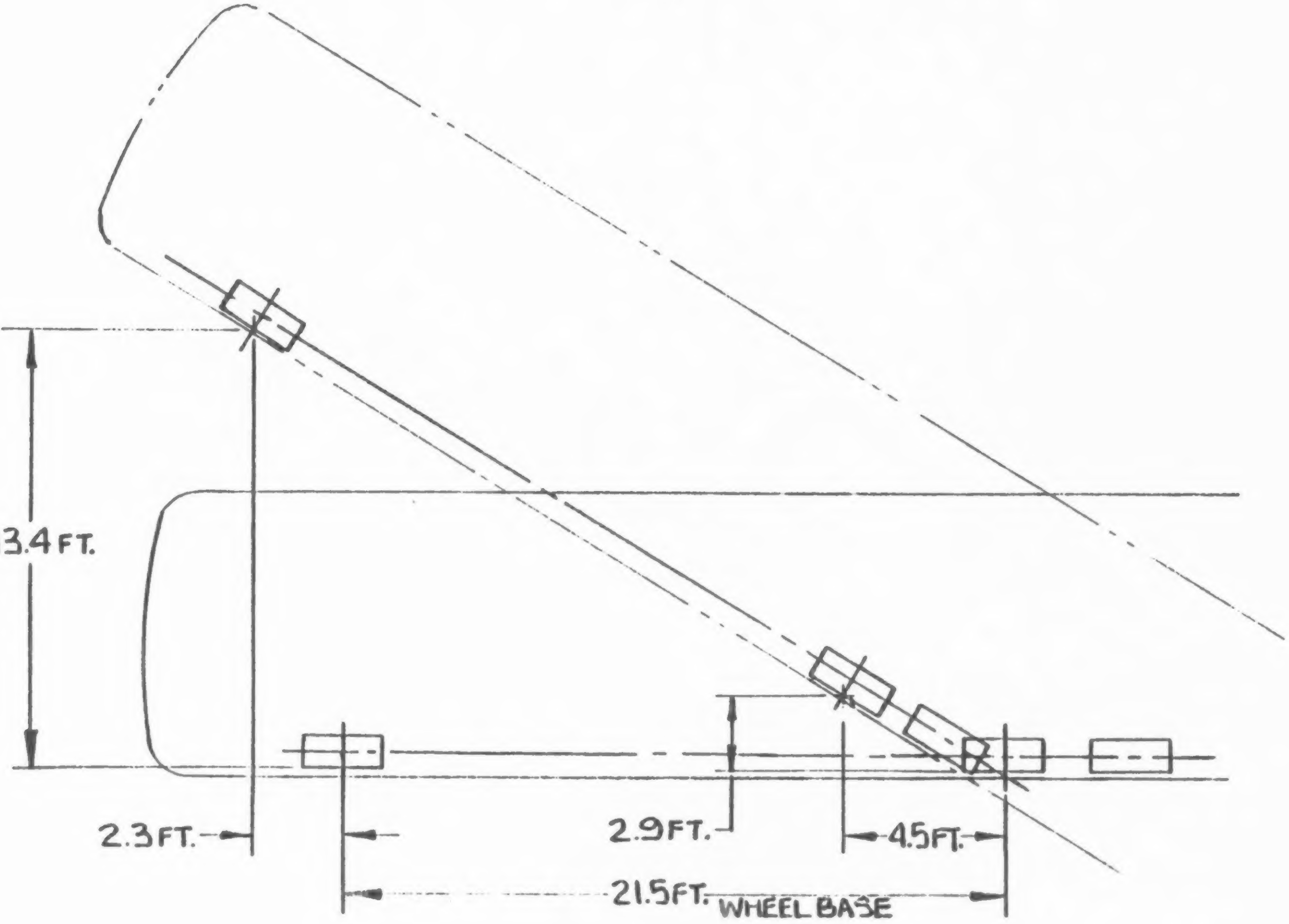
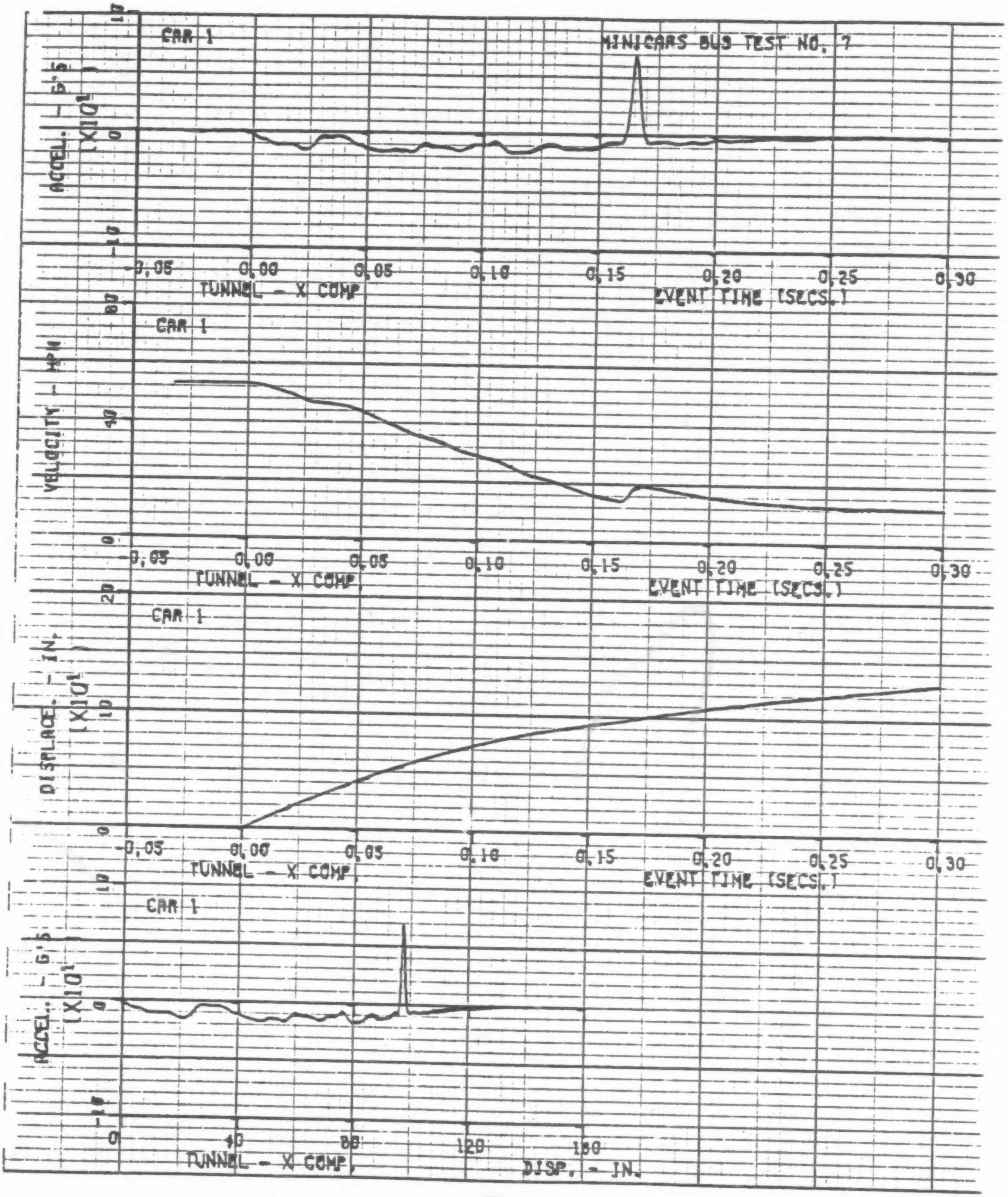

13.4 FT.
2.3 FT.
2.9 FT.
4.5 FT.
21.5 FT. WHEEL BASE

FIGURE 30 TEST NO. 7, BUS DISPLACEMENT

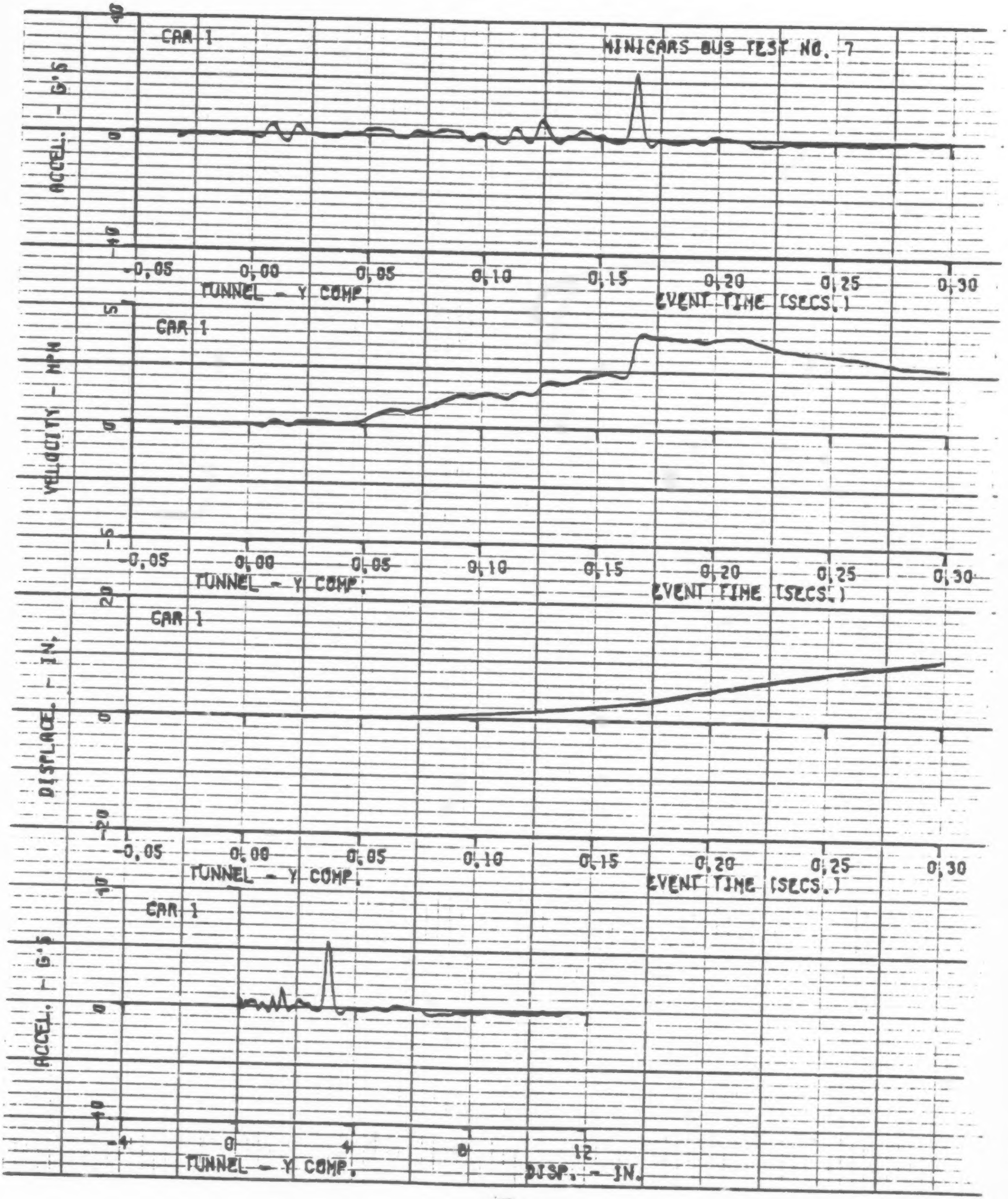
APPENDIX 3

TEST NO. 7 DATA

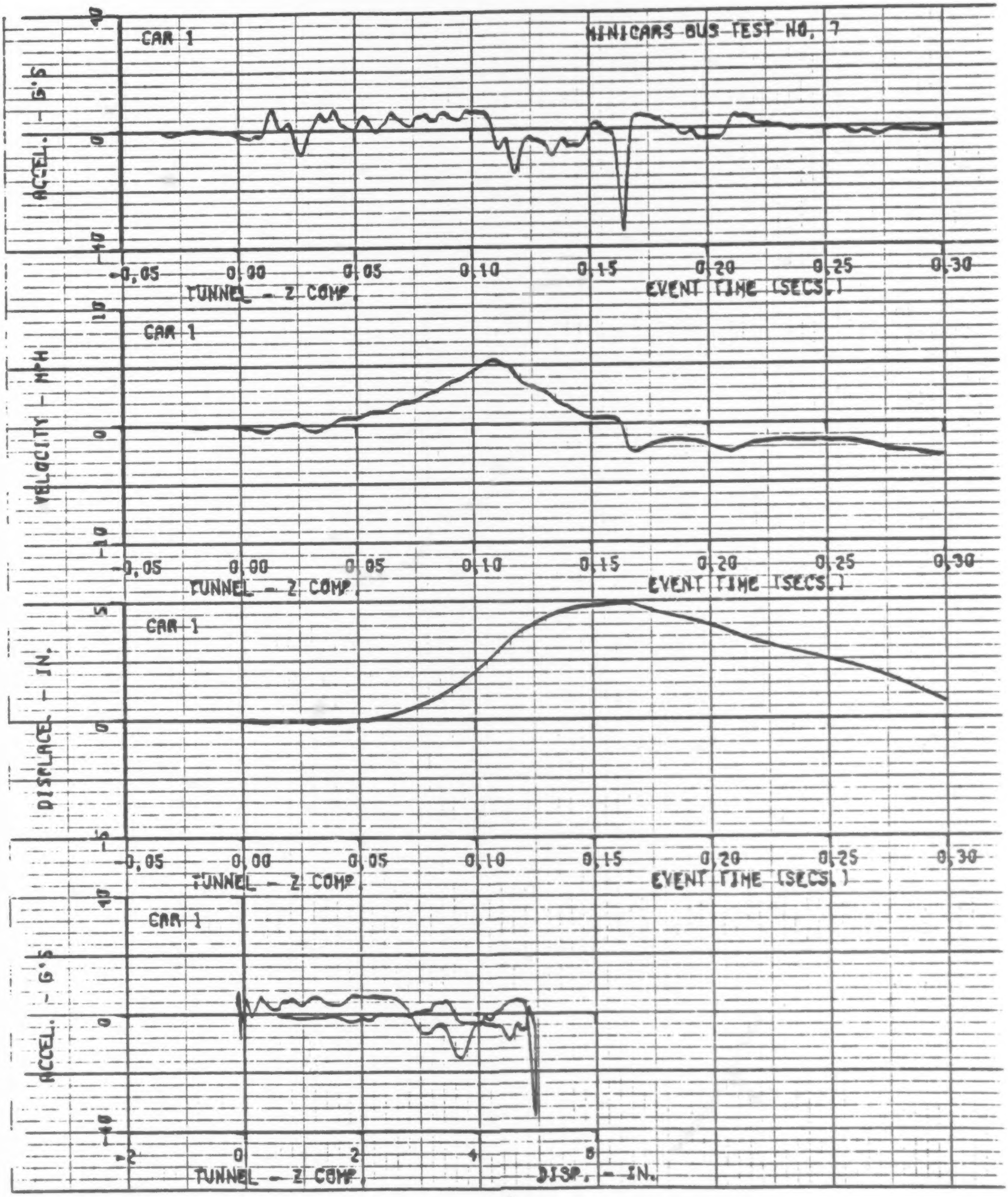
	FILTER CHANNEL CLASS
VEHICLES NOS. 1 & 2 DATA	60
HEAD ACCELERATION	1000
CHEST ACCELERATION	180
BELT LOADS	60
FEMUR LOADS	600


MINICARS BUS TEST NO. 7
CAR 1
ACCEL. - G'S (X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
TUNNEL - X COMP.
EVENT TIME (SECS.)
CAR 1
VELOCITY - MPH
80
40
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
TUNNEL - X COMP.
EVENT TIME (SECS.)
CAR 1
DISPLACE. - IN. (X10¹)
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
TUNNEL - X COMP.
EVENT TIME (SECS.)
CAR 1
ACCEL. - G'S (X10¹)
10
0
-10
0
40
80
120
160
TUNNEL - X COMP.
DISP. - IN.

6440-V-4

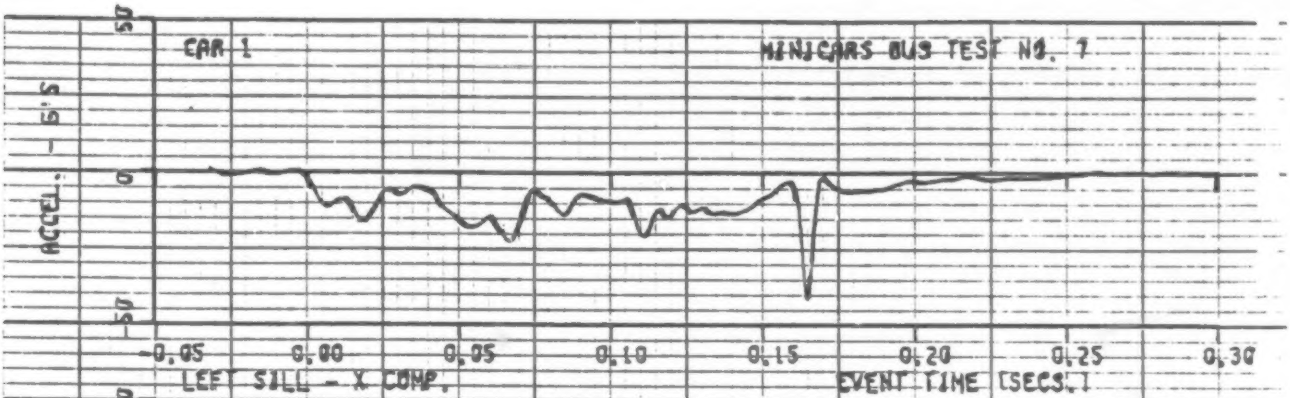

MINICARS BUS TEST NO. 7
CAR 1
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
TUNNEL - Y COMP.
EVENT TIME (SECS.)
CAR 1
VELOCITY - MPH
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
TUNNEL - Y COMP.
EVENT TIME (SECS.)
CAR 1
DISPLACE. - IN.
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
TUNNEL - Y COMP.
EVENT TIME (SECS.)
CAR 1
ACCEL. - G'S
10
0
-10
-4
0
4
8
12
TUNNEL - Y COMP.
DISP. - IN.

6440-V-4

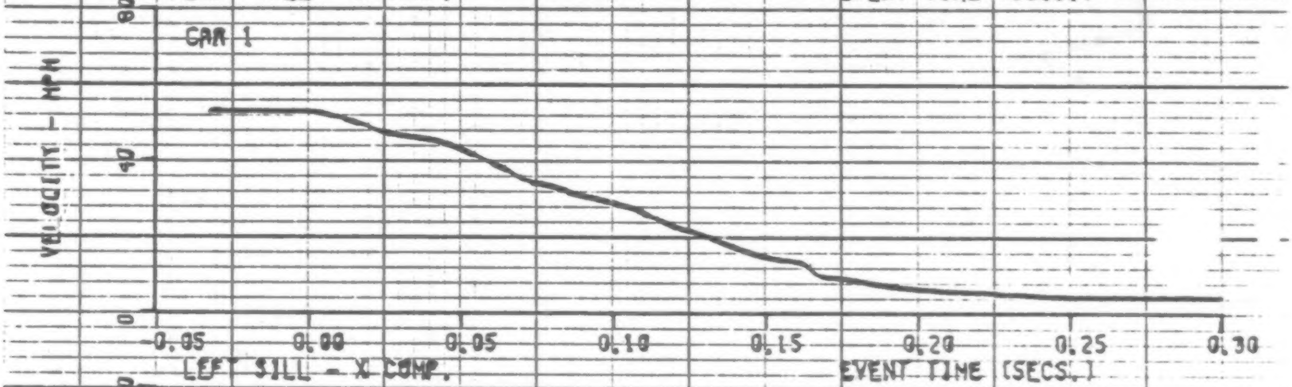

MINICARS BUS TEST NO. 7
CAR 1
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
TUNNEL - Z COMP.
EVENT TIME (SECS.)
CAR 1
VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
TUNNEL - Z COMP.
EVENT TIME (SECS.)
CAR 1
DISPLACE. - IN.
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
TUNNEL - Z COMP.
EVENT TIME (SECS.)
CAR 1
ACCEL. - G'S
10
0
-10
-2
0
2
4
6
TUNNEL - Z COMP.
DISP. - IN.

6440-V-4

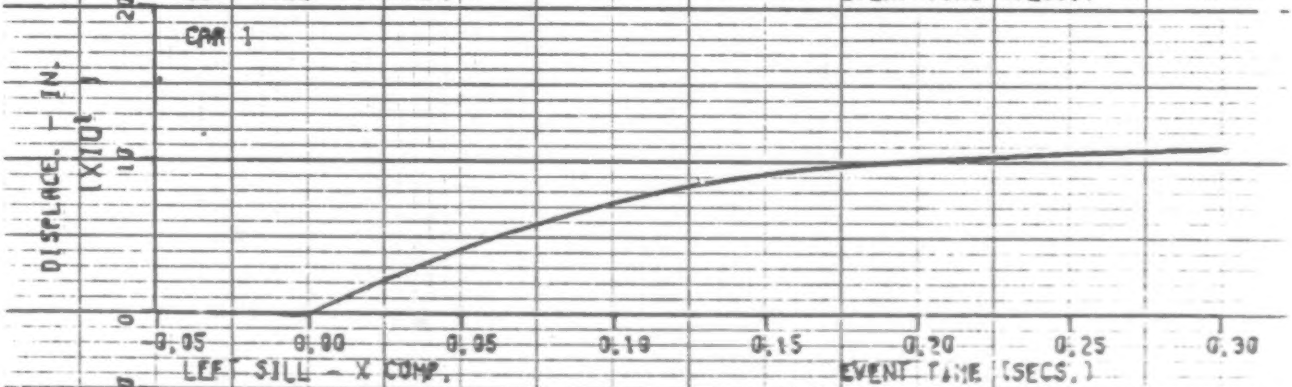
504



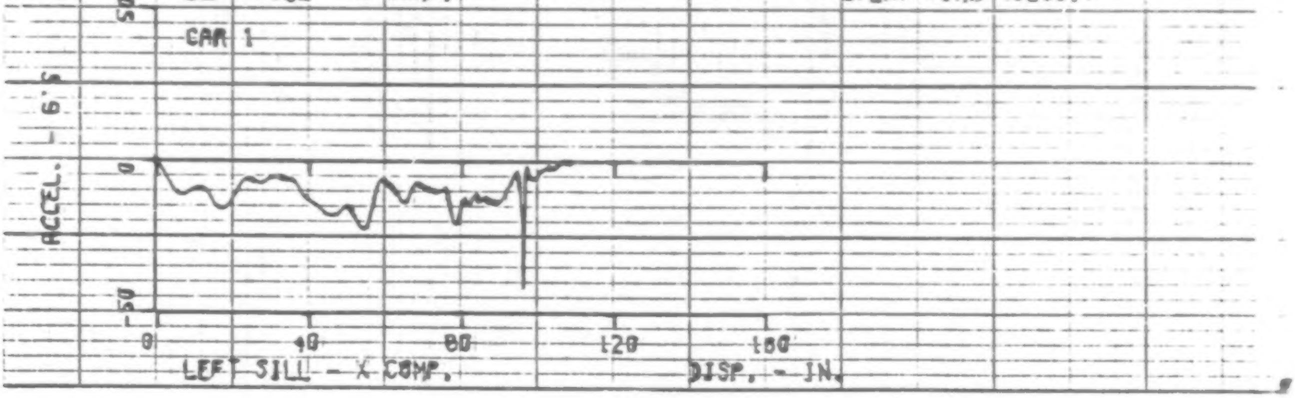
CAR 1
MINICARS BUS TEST NO. 7
ACCEL. - G'S
50
0
-50
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
LEFT SILL - X COMP.
EVENT TIME [SECS.]



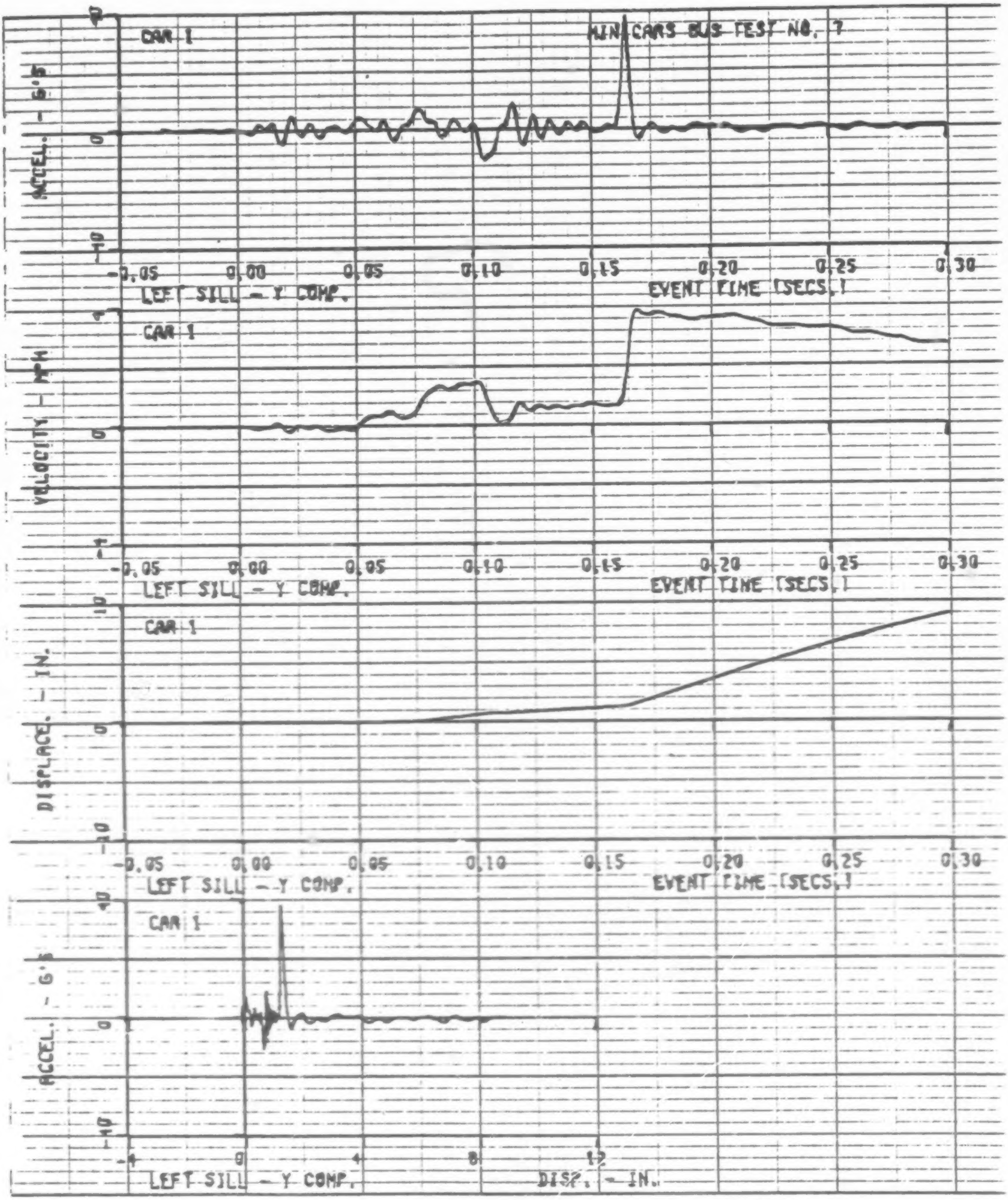
CAR 1
VELOCITY - MPH
80
40
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
LEFT SILL - X COMP.
EVENT TIME [SECS.]



CAR 1
DISPLACE. - IN. [X10¹]
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
LEFT SILL - X COMP.
EVENT TIME [SECS.]

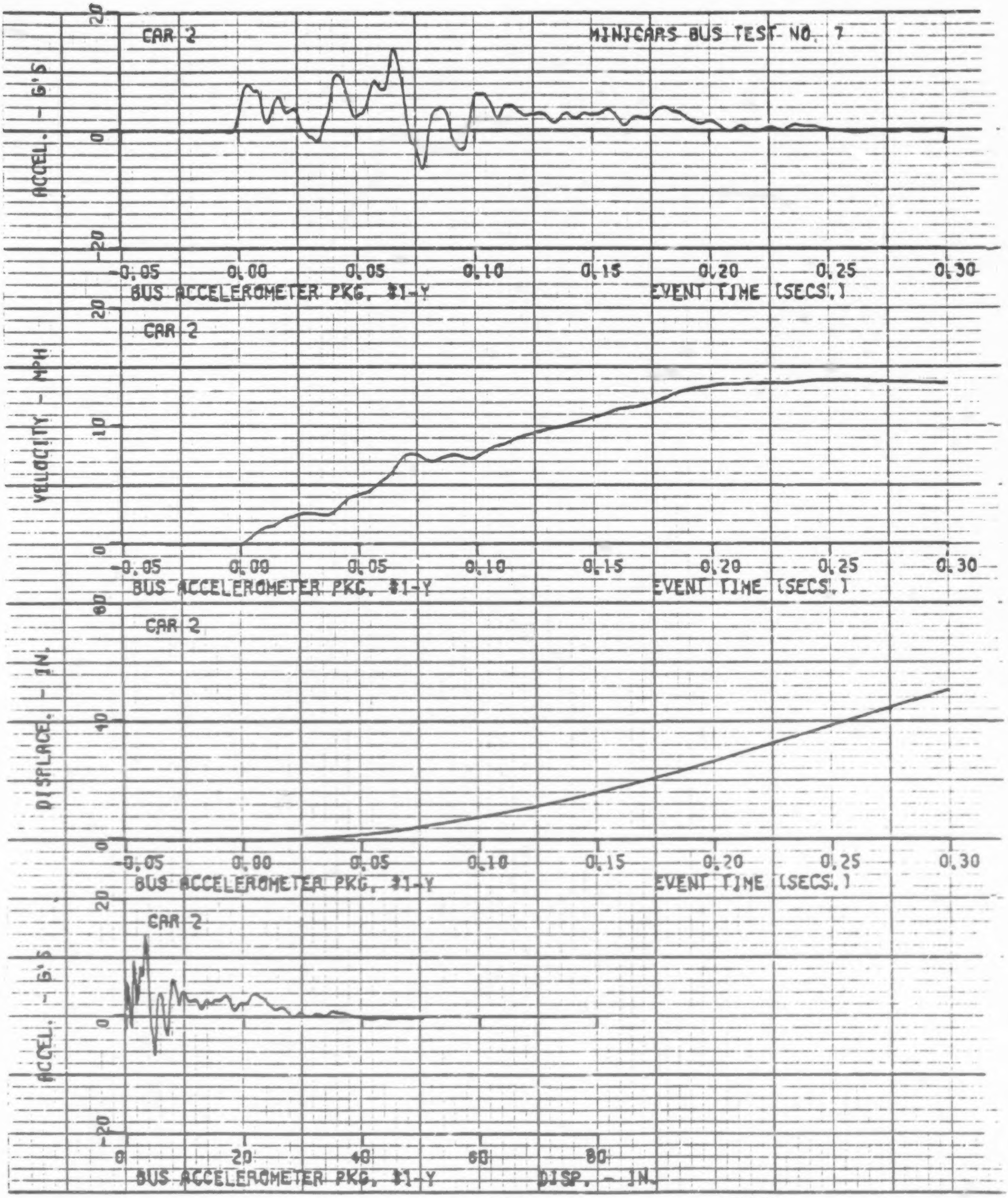


CAR 1
ACCEL. - G'S
50
0
-50
0
40
80
120
160
LEFT SILL - X COMP.
DISP. - IN.

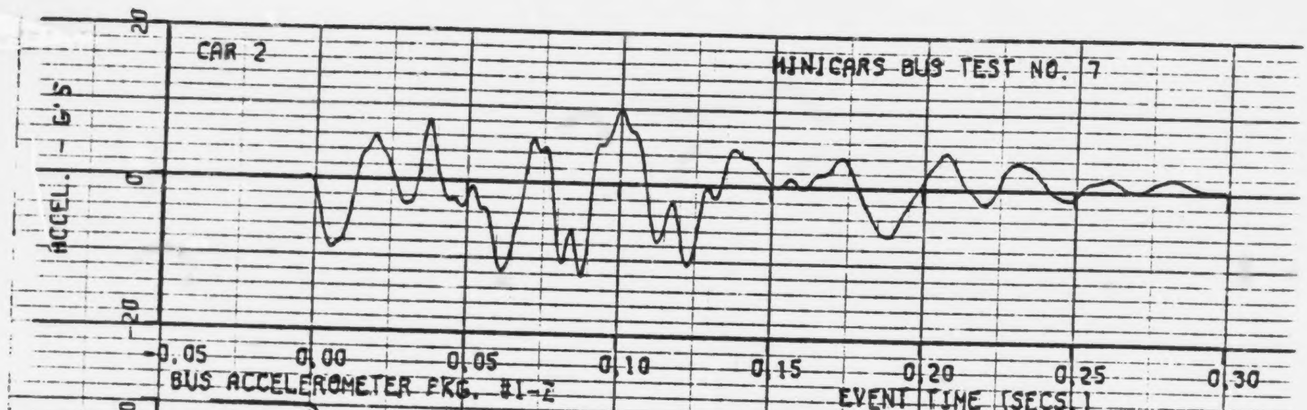

CAR 1
MIN. CARS BUS TEST NO. 7
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
LEFT SILL - Y COMP.
EVENT TIME (SECS.)
CAR 1
VELOCITY - MPH
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
LEFT SILL - Y COMP.
EVENT TIME (SECS.)
CAR 1
DISPLACE. - IN.
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
LEFT SILL - Y COMP.
EVENT TIME (SECS.)
CAR 1
ACCEL. - G'S
10
0
-10
-4
0
4
8
12
LEFT SILL - Y COMP.
DISP. - IN.

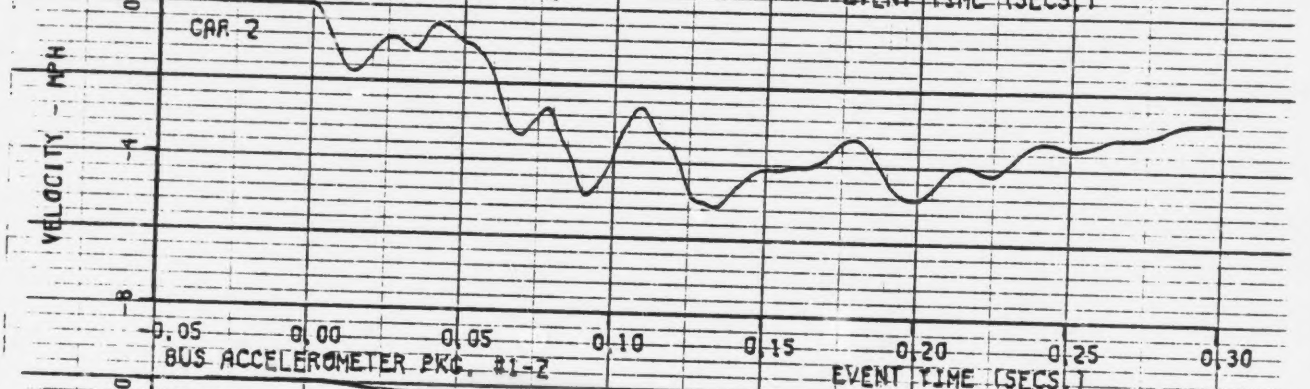
6440-V-4

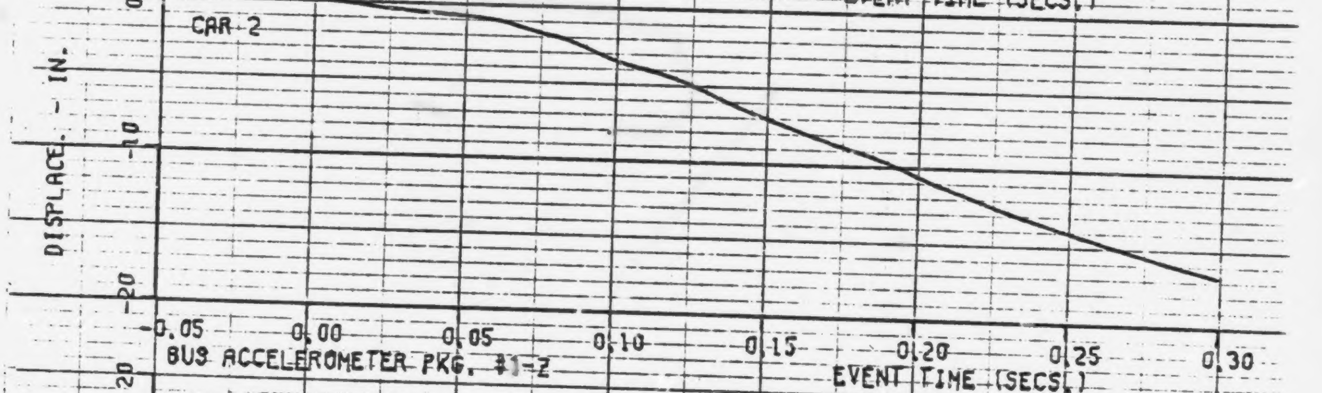
506

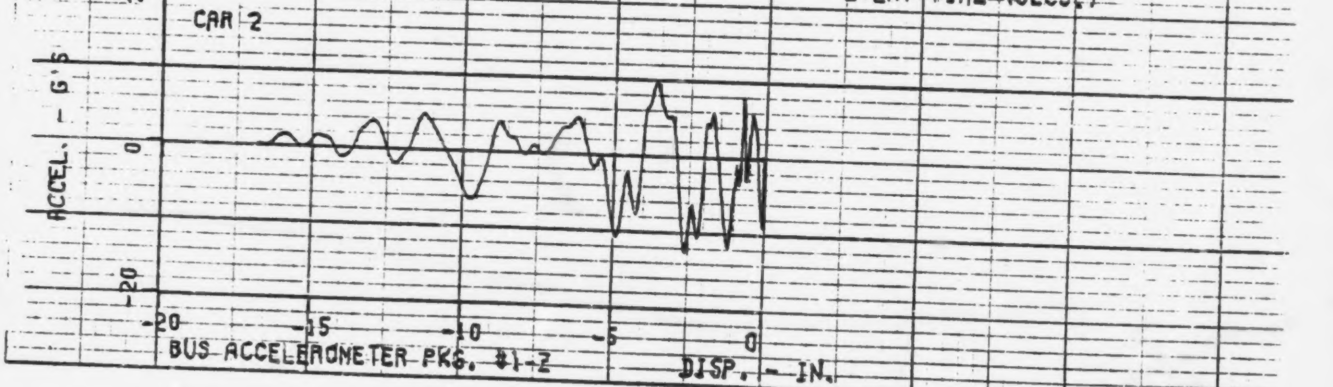

CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Y
EVENT TIME (SECS.)
CAR 2
VELOCITY - MPH
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Y
EVENT TIME (SECS.)
CAR 2
DISPLACE. - IN.
80
40
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Y
EVENT TIME (SECS.)
CAR 2
ACCEL. - G'S
20
0
-20
0
20
40
60
80
BUS ACCELEROMETER PKG. #1-Y
DISP. - IN.

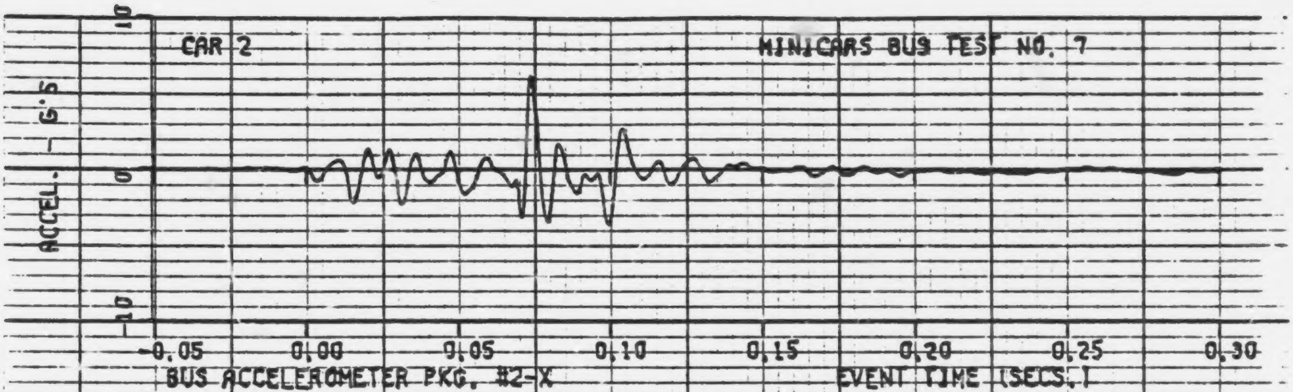
6440-V-4

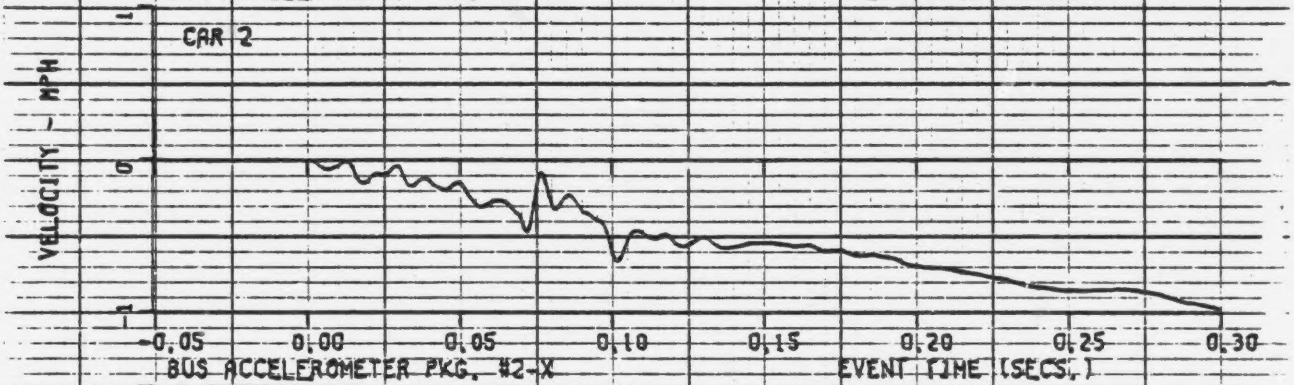

CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Z
EVENT TIME (SECS.)

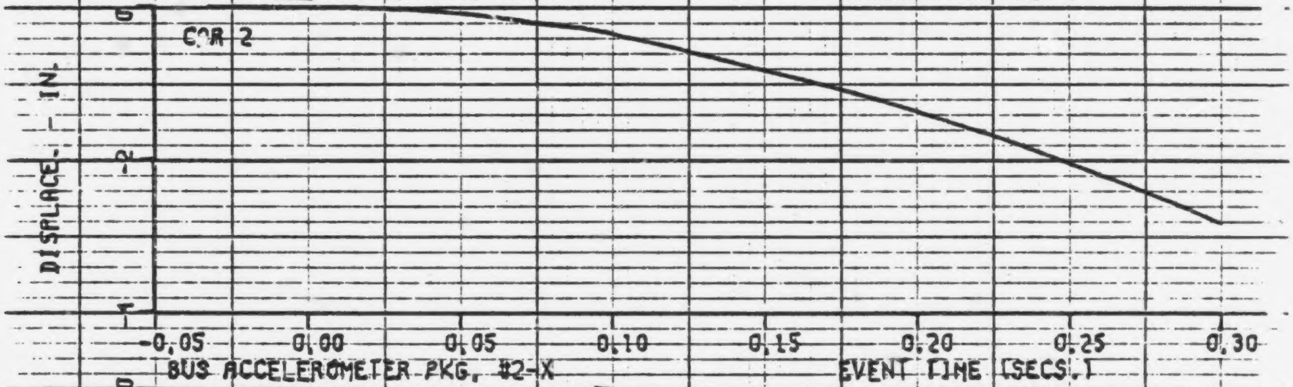

CAR 2
VELOCITY - MPH
0
-4
-8
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Z
EVENT TIME (SECS.)

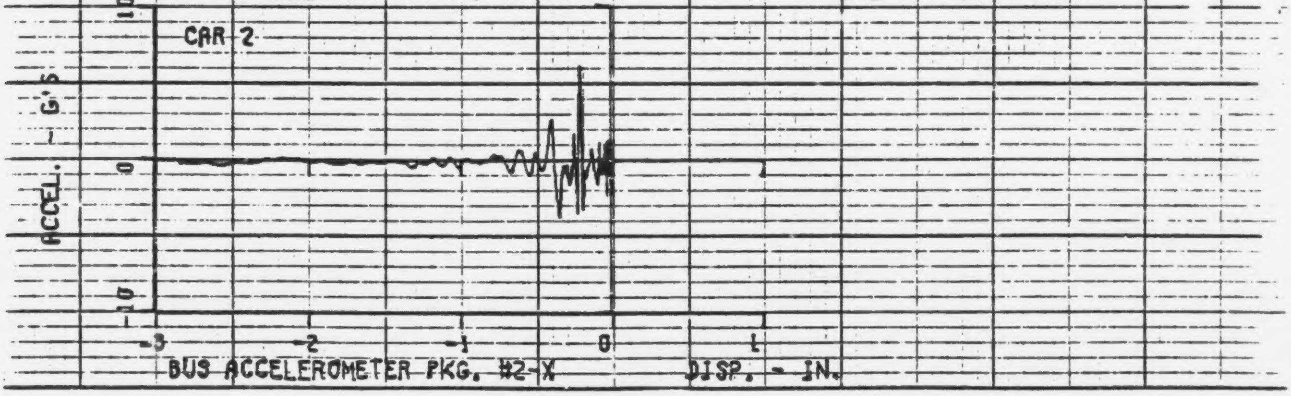

CAR 2
DISPLACE. - IN.
0
-10
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #1-Z
EVENT TIME (SECS.)


CAR 2
ACCEL. - G'S
20
0
-20
-20
-15
-10
-5
0
BUS ACCELEROMETER PKG. #1-Z
DISP. - IN.

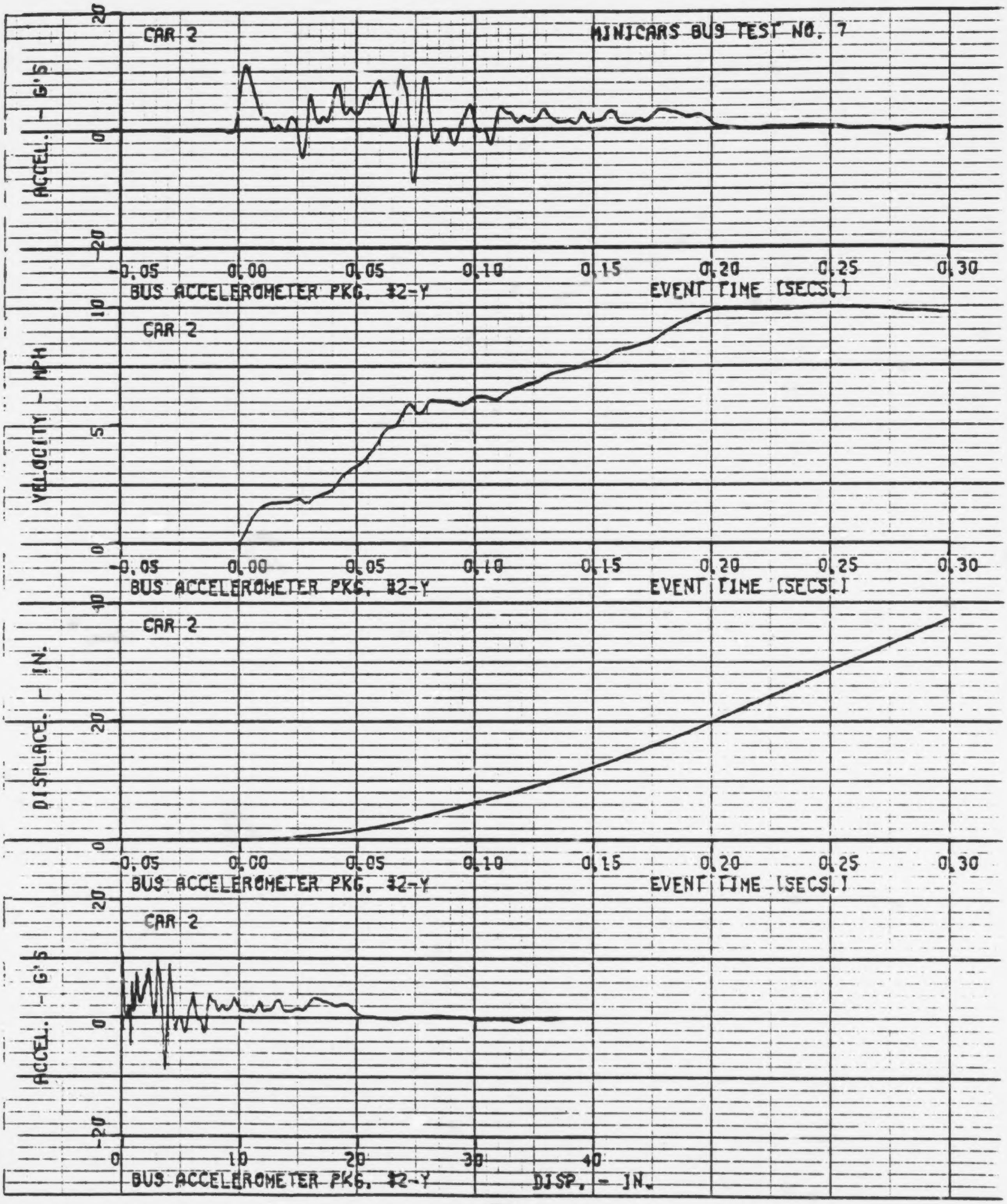

CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-X
EVENT TIME (SECS.)


CAR 2
VELOCITY - MPH
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-X
EVENT TIME (SECS.)

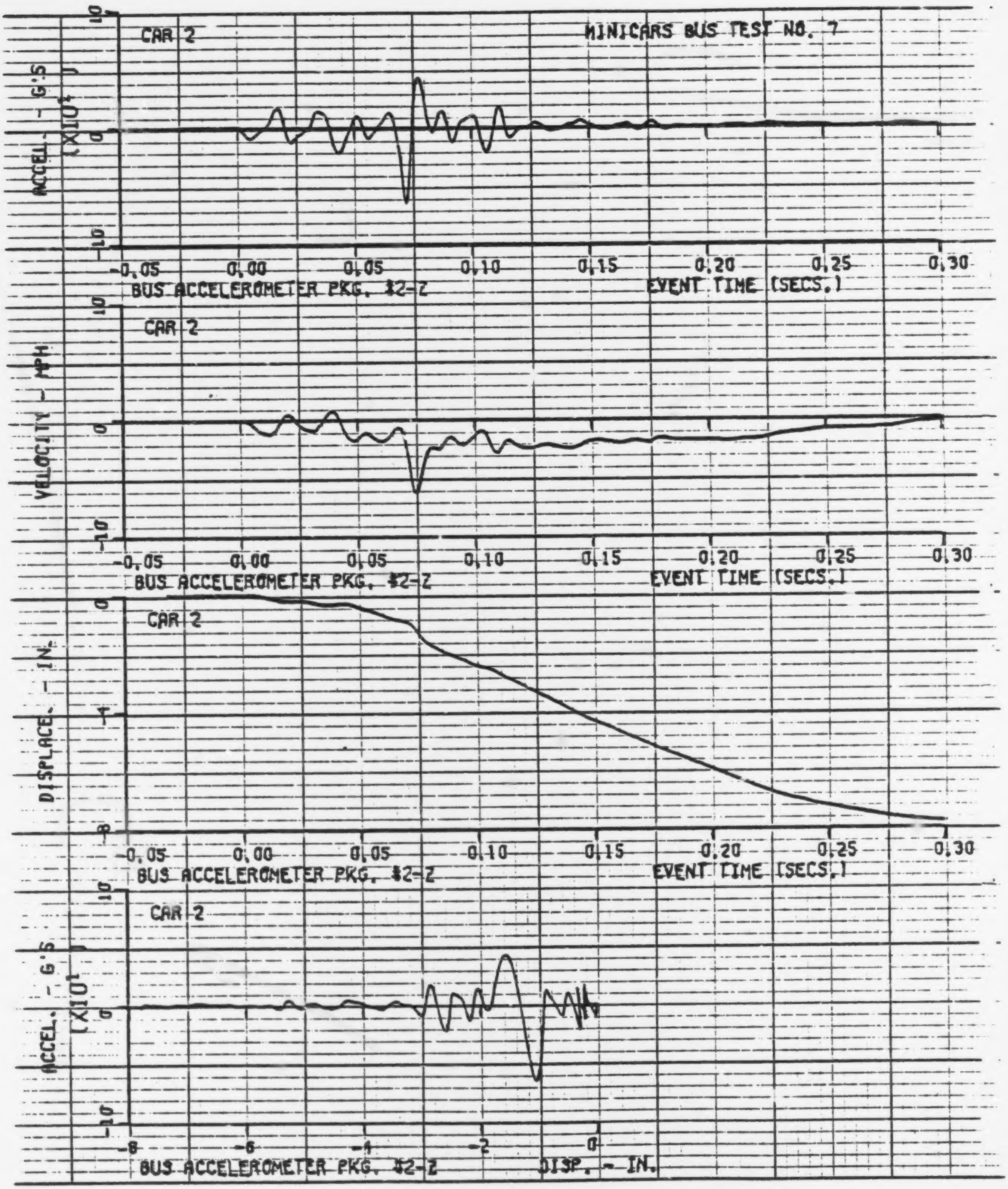

CAR 2
DISPLACE. - IN.
0
-2
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-X
EVENT TIME (SECS.)


CAR 2
ACCEL. - G'S
10
0
-10
-3
-2
-1
0
1
BUS ACCELEROMETER PKG. #2-X
DISP. - IN.

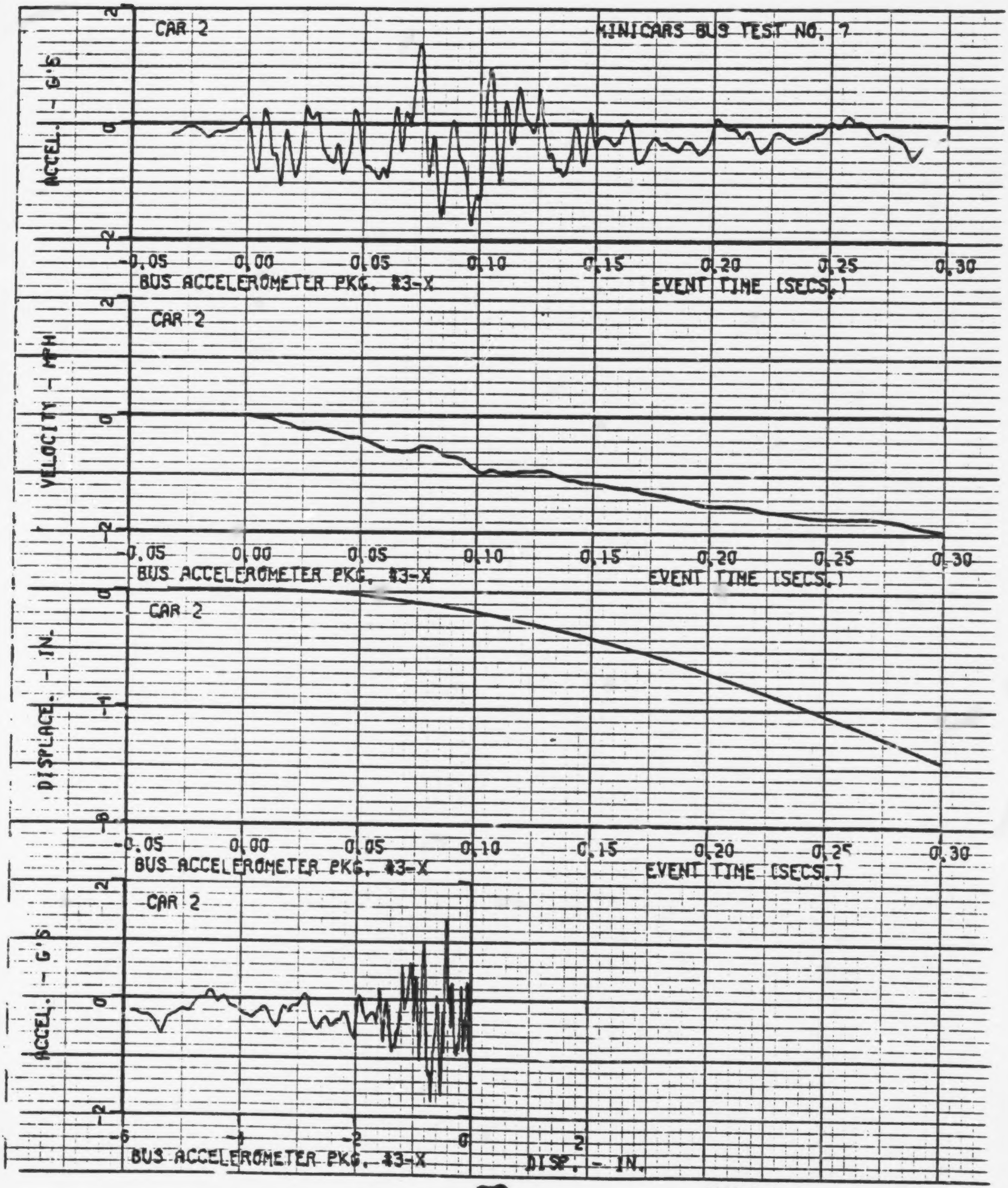
6440-V-4


MINICARS BUS TEST NO. 7
CAR 2
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-Y
EVENT TIME (SECS.)
CAR 2
VELOCITY - MPH
10
5
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-Y
EVENT TIME (SECS.)
CAR 2
DISPLACE. - IN.
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-Y
EVENT TIME (SECS.)
CAR 2
ACCEL. - G'S
20
0
-20
0
10
20
30
40
BUS ACCELEROMETER PKG. #2-Y
DISP. - IN.

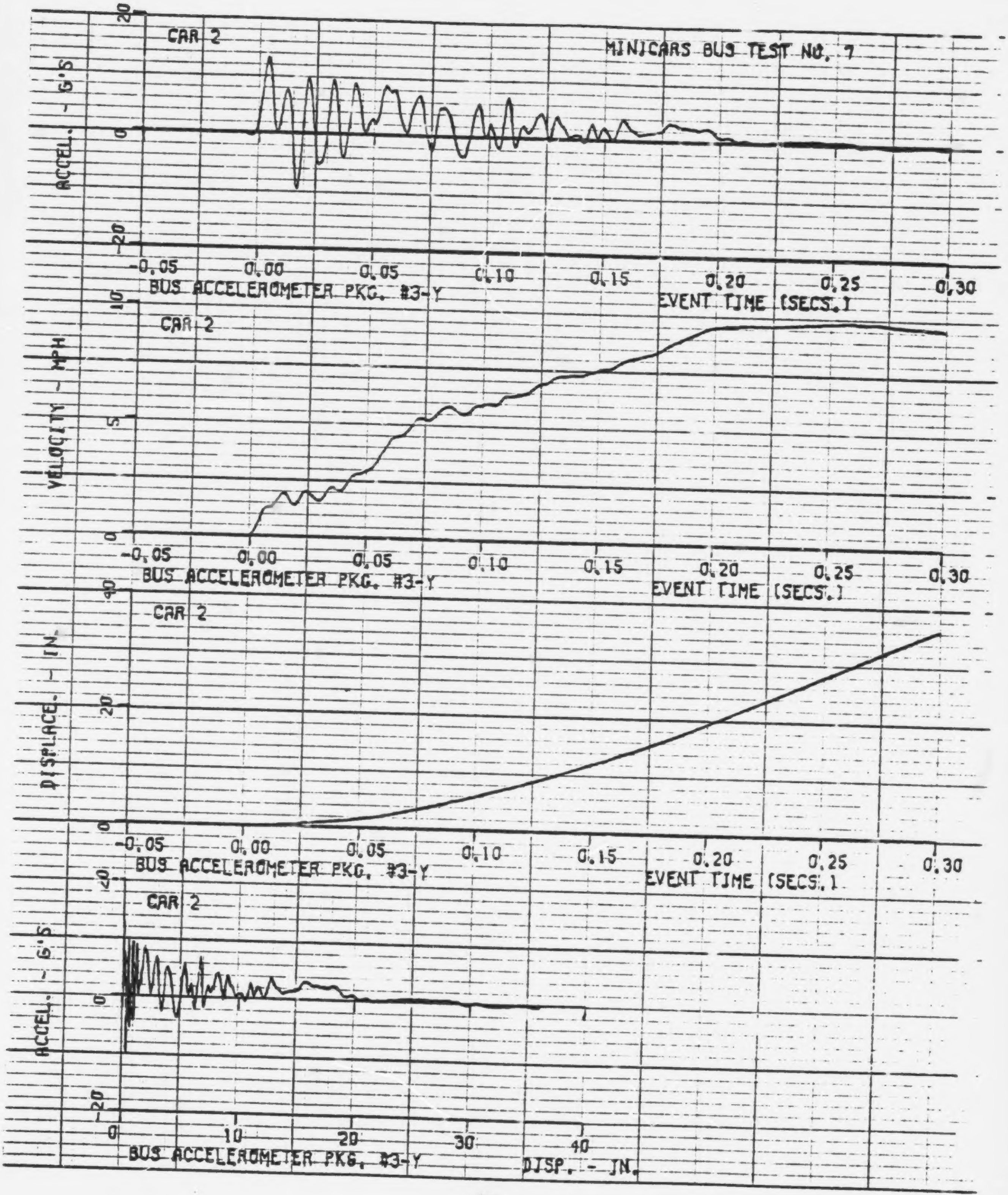
6440-V-4

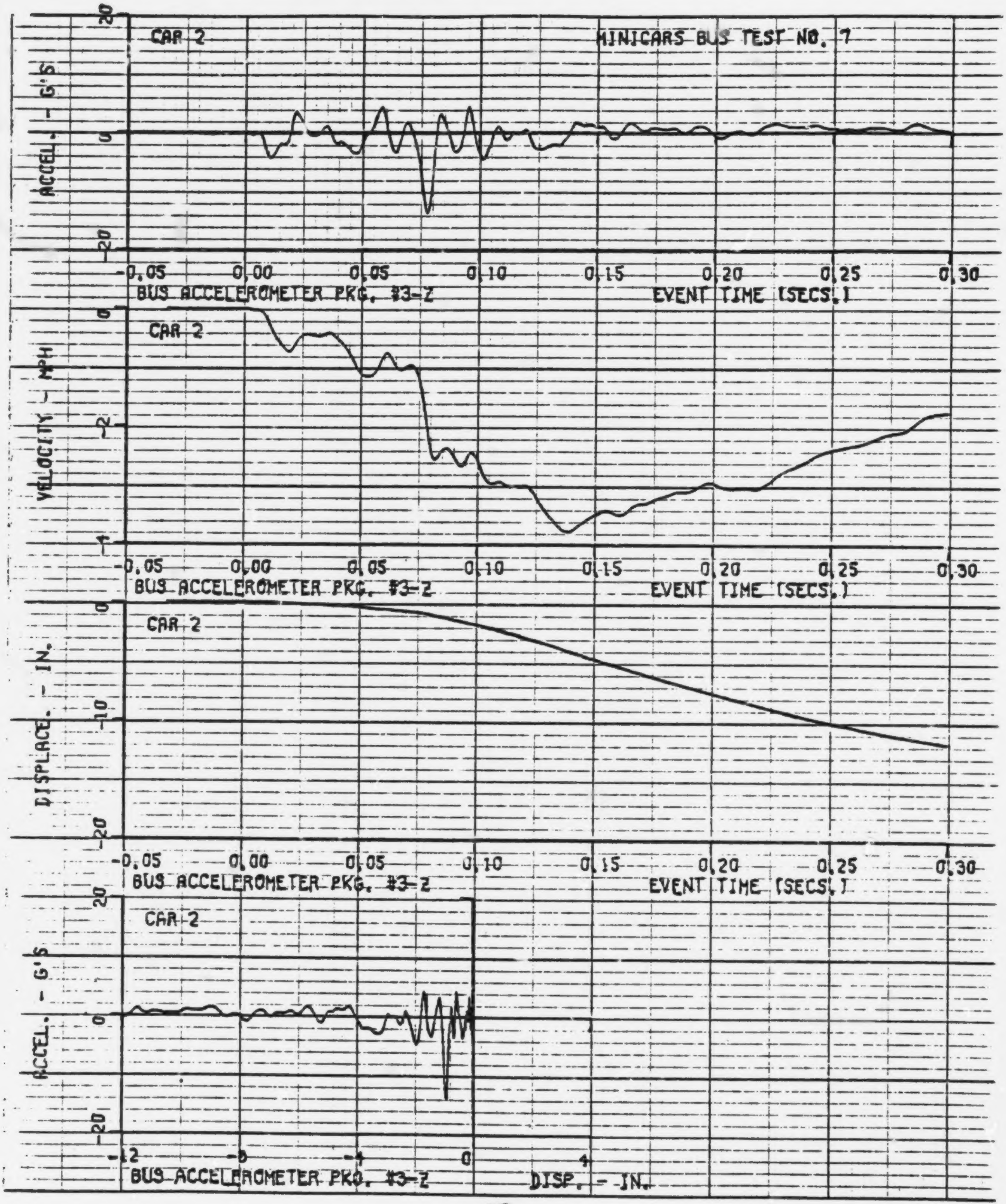

MINICARS BUS TEST NO. 7
CAR 2
ACCEL. - G'S (X10¹)
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-Z
EVENT TIME (SECS.)
CAR 2
VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-Z
EVENT TIME (SECS.)
CAR 2
DISPLACE. - IN.
0
-4
-8
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #2-Z
EVENT TIME (SECS.)
CAR 2
ACCEL. - G'S (X10¹)
10
0
-10
-8
-6
-4
-2
0
BUS ACCELEROMETER PKG. #2-Z
DISP. - IN.

6440-V-4

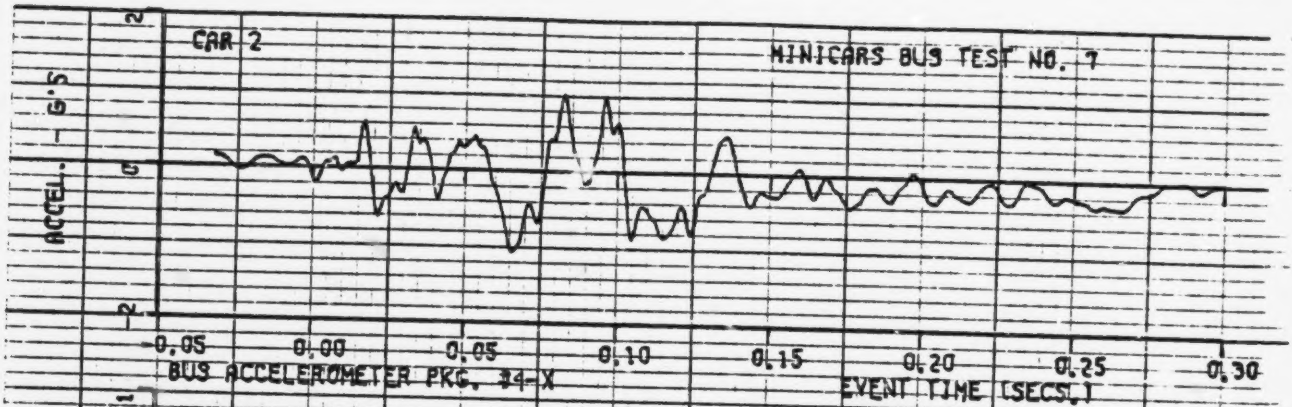

CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-X
EVENT TIME (SECS.)
CAR 2
VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-X
EVENT TIME (SECS.)
0
CAR 2
DISPLACE. - IN.
-4
-8
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-X
EVENT TIME (SECS.)
2
CAR 2
ACCEL. - G'S
0
-2
-6
-4
-2
0
2
BUS ACCELEROMETER PKG. #3-X
DISP. - IN.

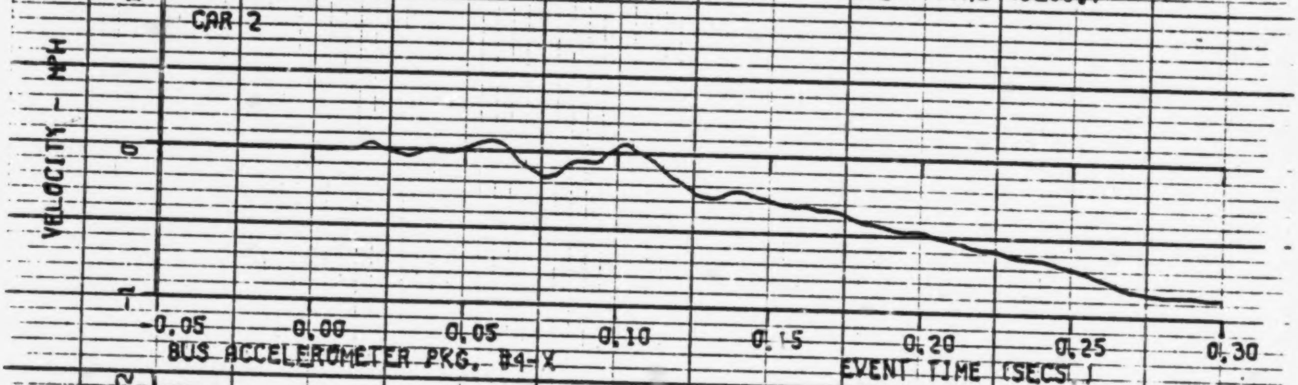
6440-V-4

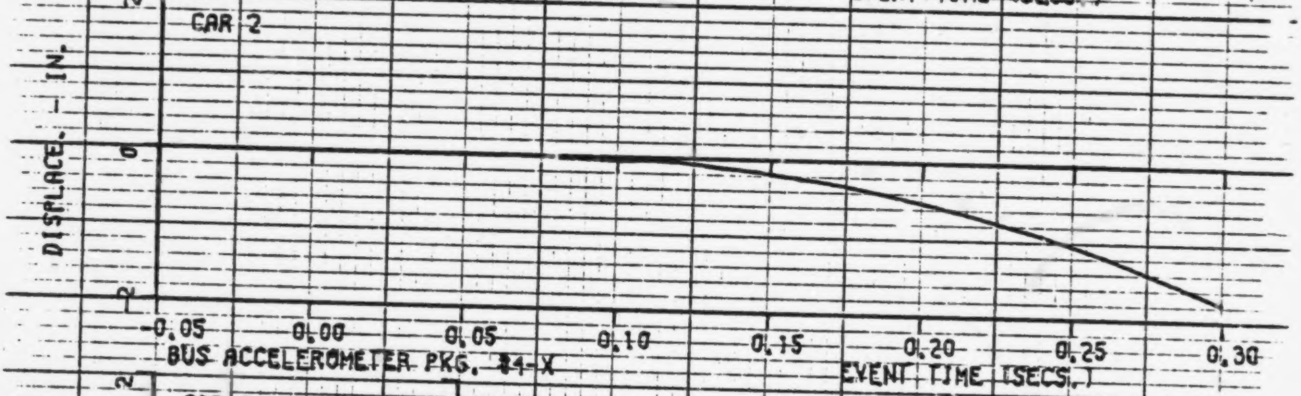

MINICARS BUS TEST NO. 7
CAR 2
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-Y
EVENT TIME (SECS.)
CAR 2
VELOCITY - MPH
10
5
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-Y
EVENT TIME (SECS.)
CAR 2
DISPLACE. - IN.
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-Y
EVENT TIME (SECS.)
CAR 2
ACCEL. - G'S
20
0
-20
0
10
20
30
40
BUS ACCELEROMETER PKG. #3-Y
DISP. - IN.

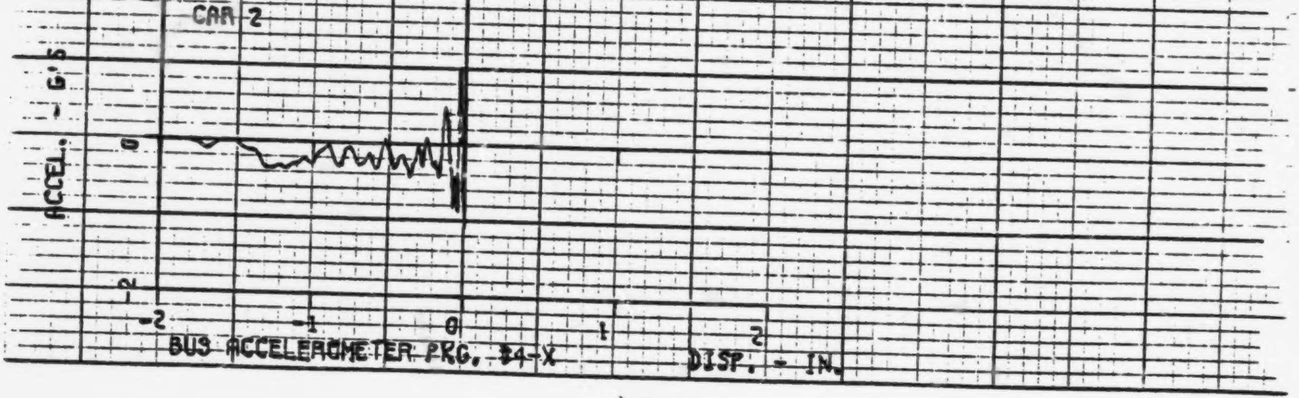

CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-Z
EVENT TIME (SECS.)
CAR 2
VELOCITY - MPH
0
-2
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-Z
EVENT TIME (SECS.)
CAR 2
DISPLACE. - IN.
0
-10
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #3-Z
EVENT TIME (SECS.)
CAR 2
ACCEL. - G'S
20
0
-20
-12
-8
-4
0
4
BUS ACCELEROMETER PKG. #3-Z
DISP. - IN.

6440-V-4

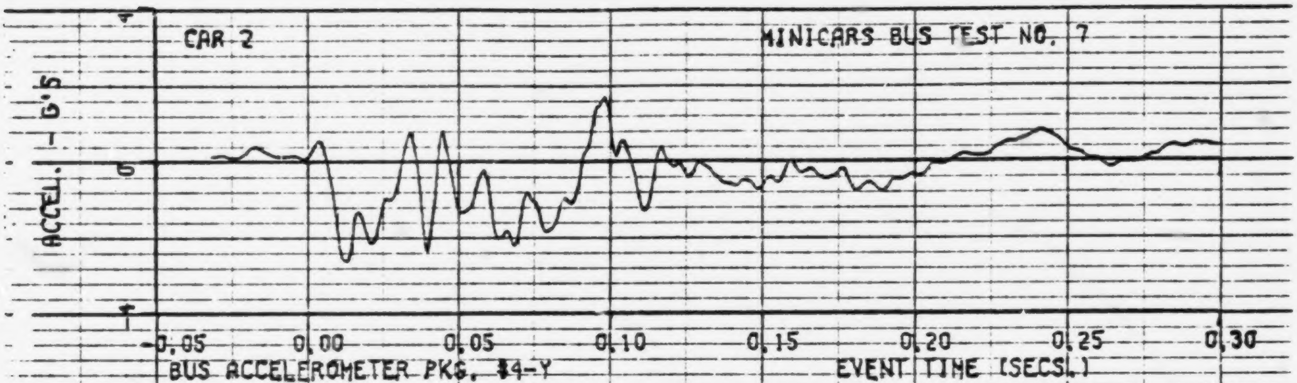

CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-X
EVENT TIME (SECS.)

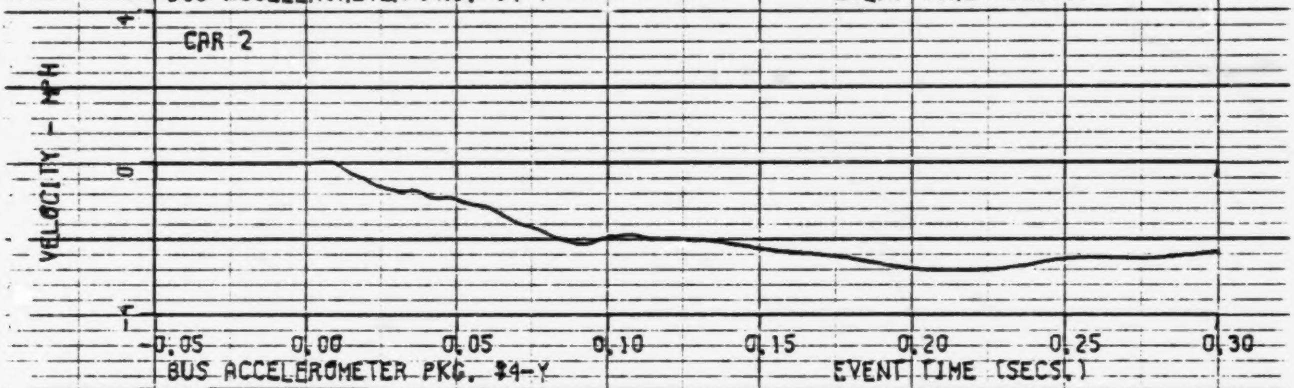

CAR 2
VELOCITY - MPH
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-X
EVENT TIME (SECS.)

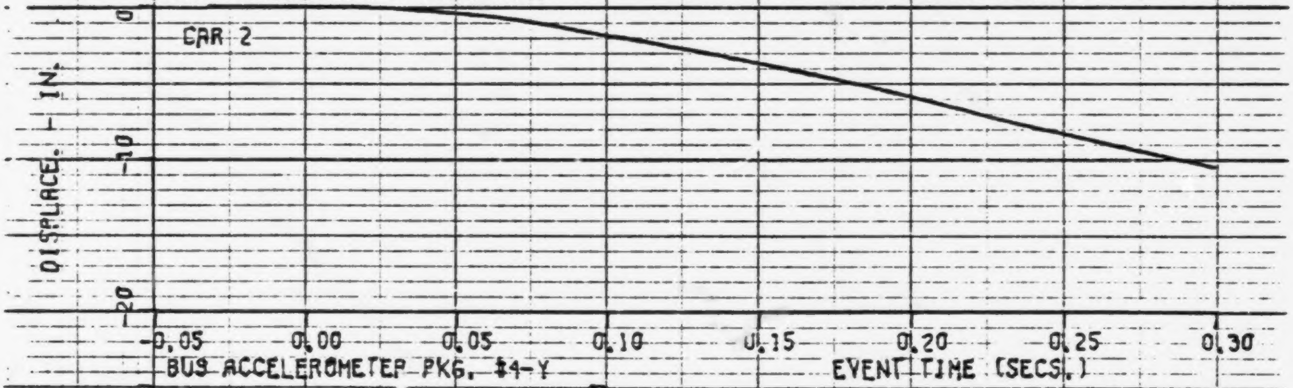

CAR 2
DISPLACE. - IN.
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-X
EVENT TIME (SECS.)

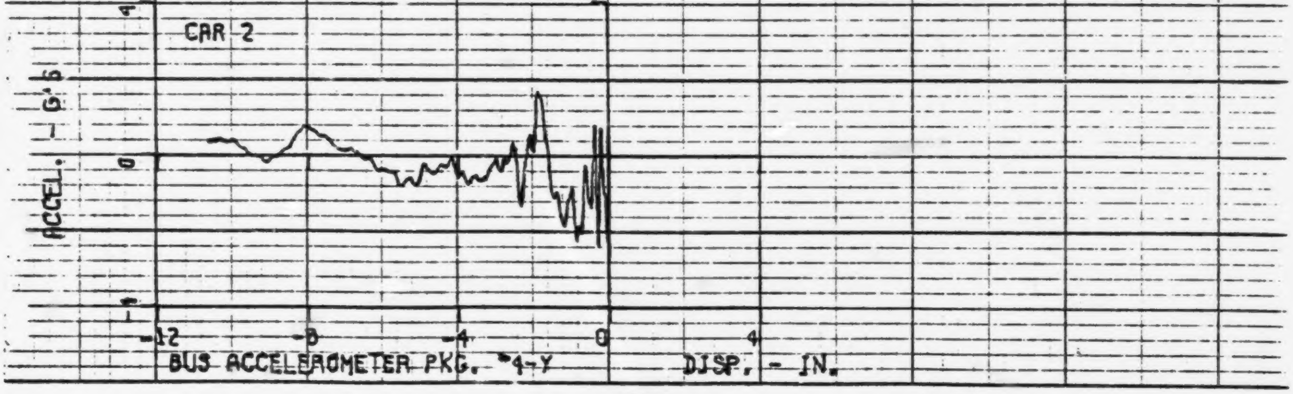

CAR 2
ACCEL. - G'S
2
0
-2
-2
-1
0
1
2
BUS ACCELEROMETER PKG. #4-X
DISP. - IN.

6440-V-4


CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-Y
EVENT TIME (SECS.)

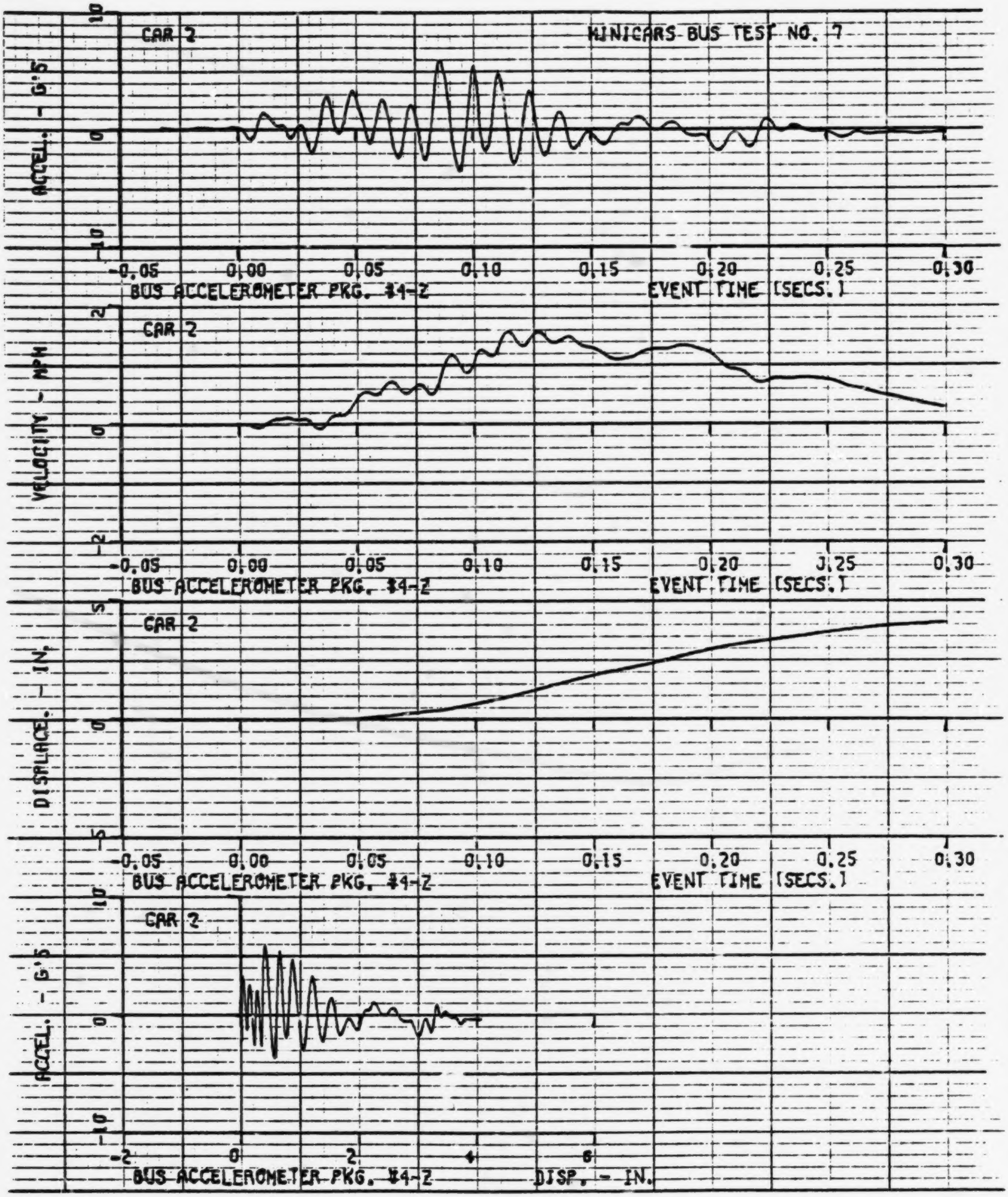

CAR 2
VELOCITY - MPH
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-Y
EVENT TIME (SECS.)


CAR 2
DISPLACE. - IN.
0
-10
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-Y
EVENT TIME (SECS.)

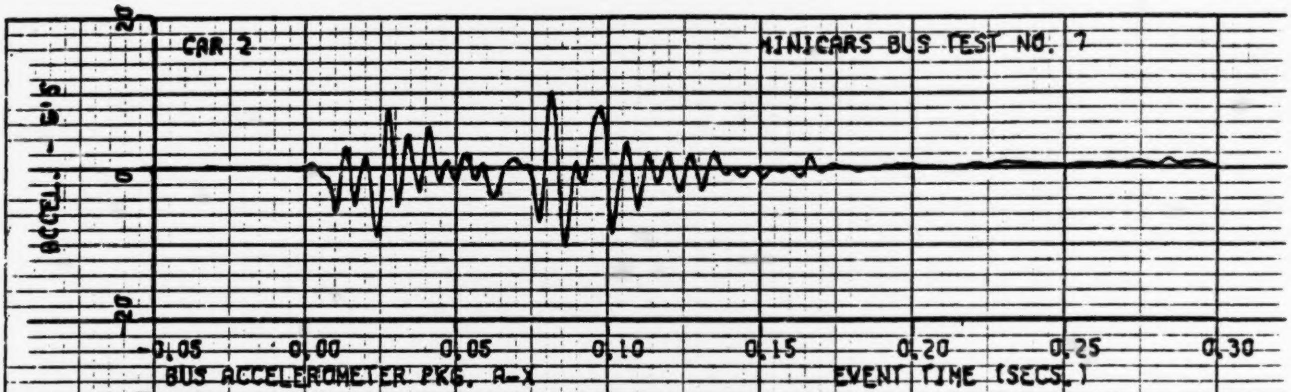

CAR 2
ACCEL. - G'S
4
0
-4
-12
-8
-4
0
4
BUS ACCELEROMETER PKG. #4-Y
DISP. - IN.

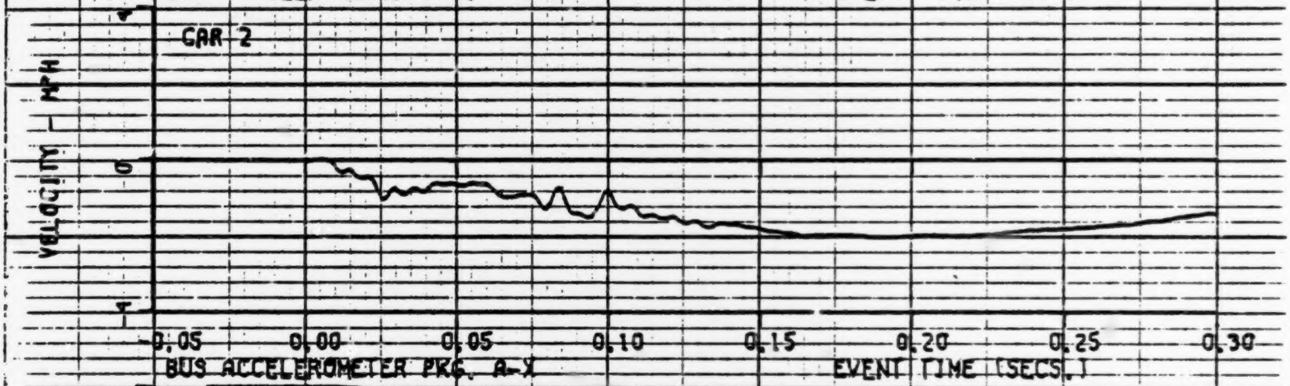
6440-V-4

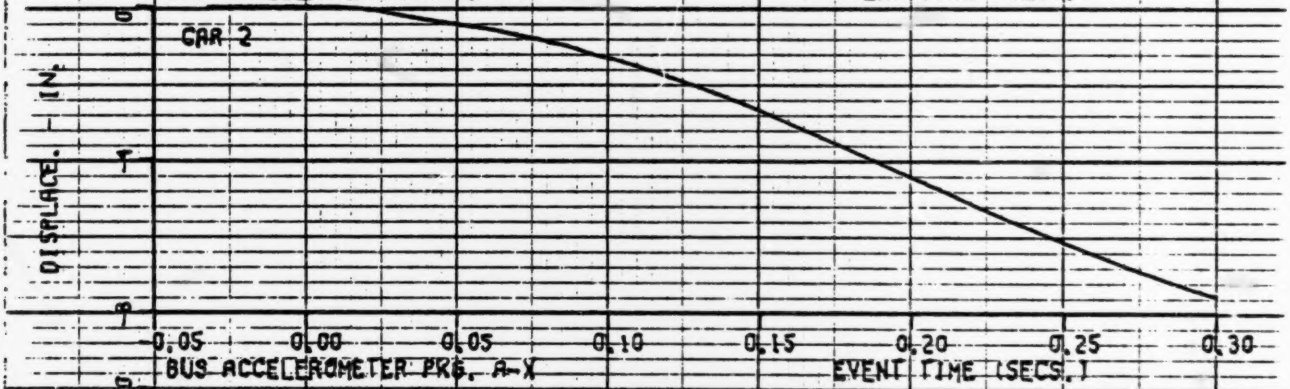
516

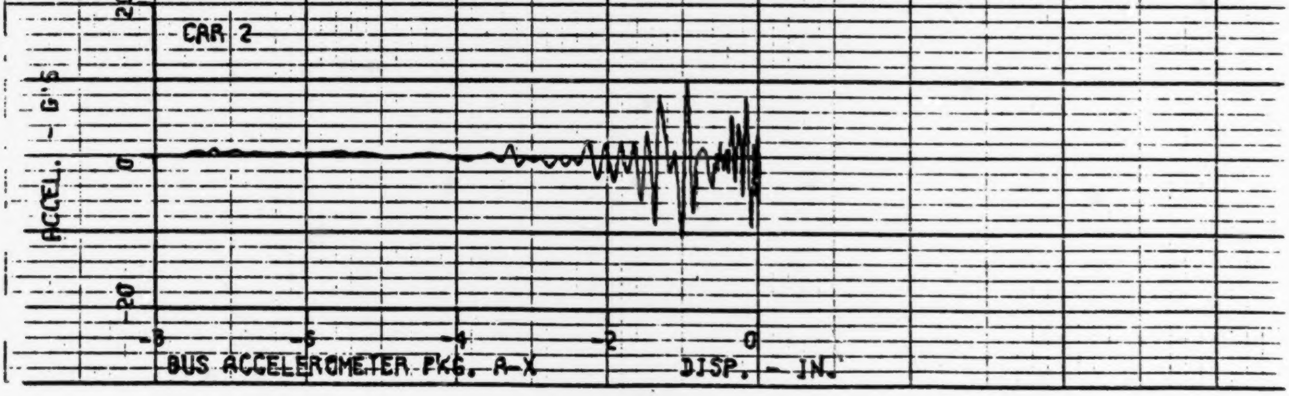

CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-Z
EVENT TIME [SECS.]
CAR 2
VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-Z
EVENT TIME [SECS.]
CAR 2
DISPLACE. - IN.
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. #4-Z
EVENT TIME [SECS.]
CAR 2
ACCEL. - G'S
10
0
-10
-2
0
2
4
6
BUS ACCELEROMETER PKG. #4-Z
DISP. - IN.

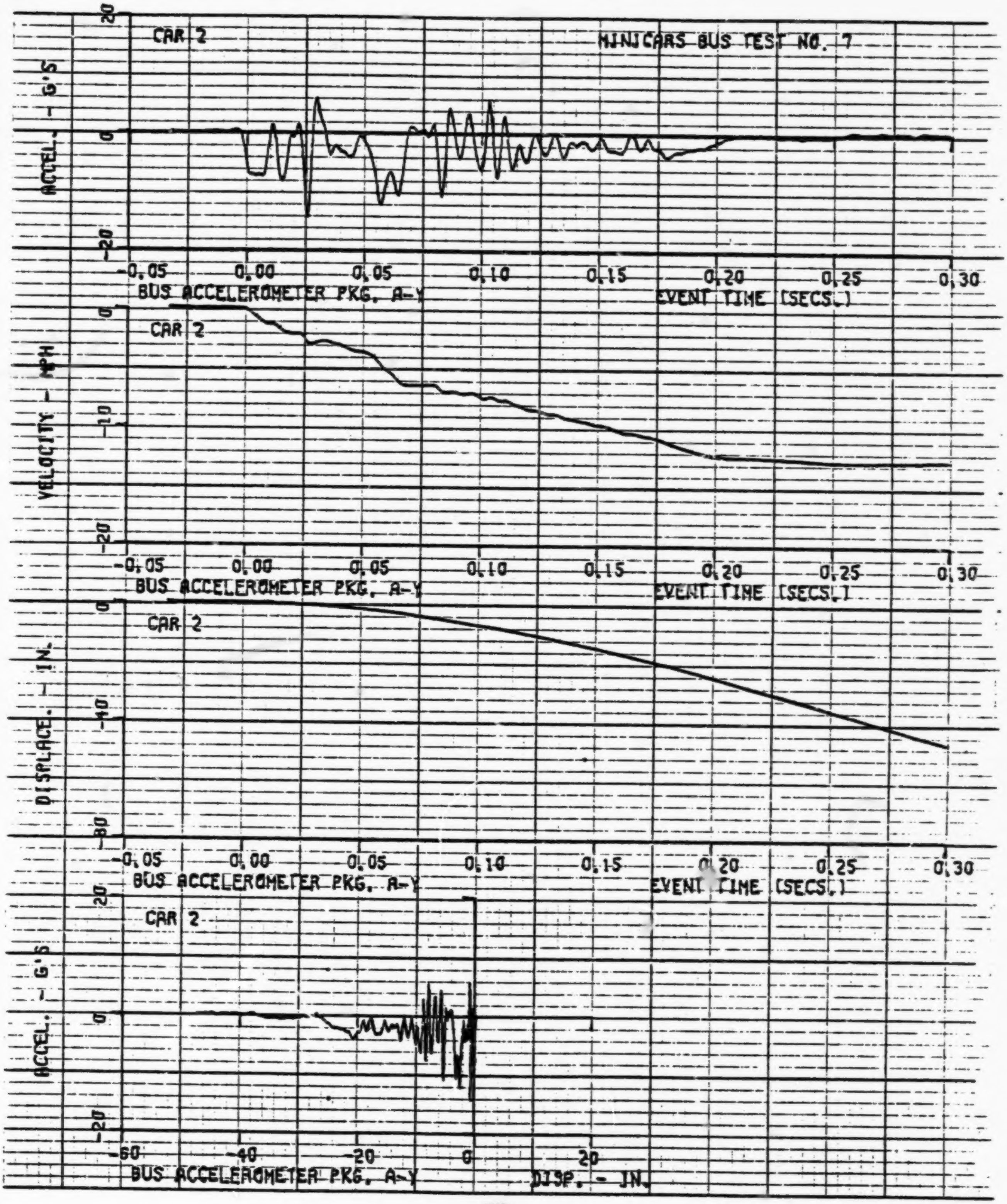
6440-V-4


CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-X
EVENT TIME (SECS.)

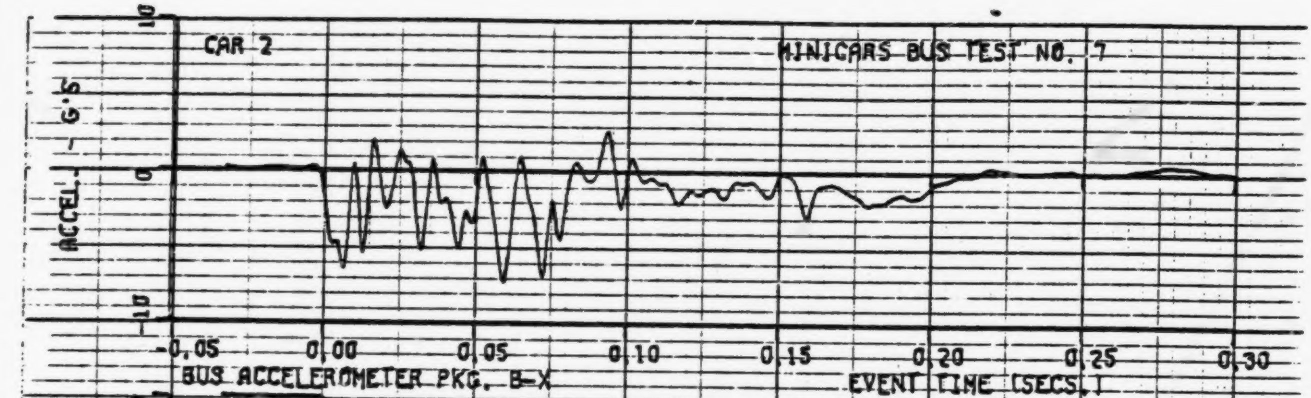

CAR 2
VELOCITY - MPH
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-X
EVENT TIME (SECS.)

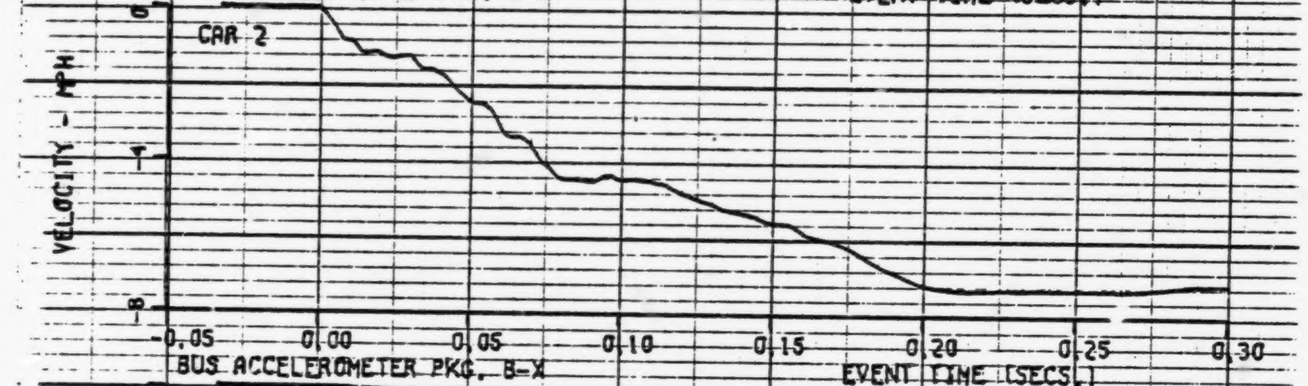

CAR 2
DISPLACE. - IN.
0
-4
-8
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-X
EVENT TIME (SECS.)

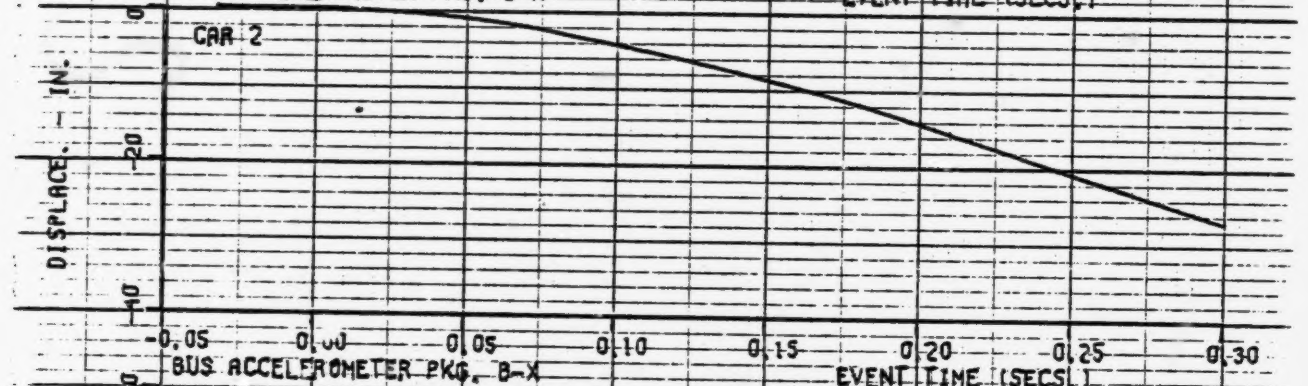

CAR 2
ACCEL. - G'S
20
0
-20
-8
-6
-4
-2
0
BUS ACCELEROMETER PKG. A-X
DISP. - IN.

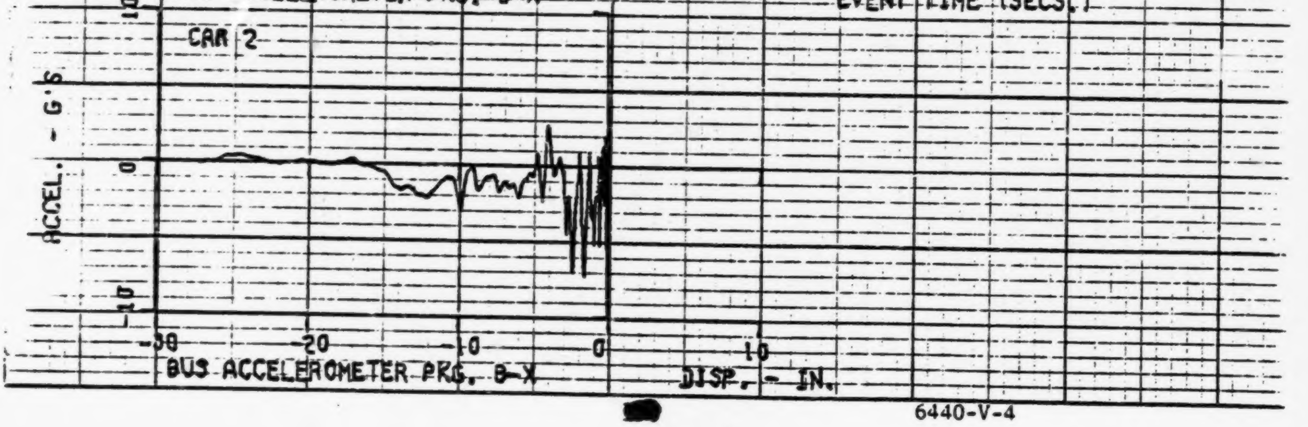

CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-Y
EVENT TIME (SECS.)
CAR 2
VELOCITY - MPH
0
-10
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-Y
EVENT TIME (SECS.)
CAR 2
DISPLACE. - IN.
0
-40
-80
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. A-Y
EVENT TIME (SECS.)
CAR 2
ACCEL. - G'S
20
0
-20
-60
-40
-20
0
20
BUS ACCELEROMETER PKG. A-Y
DISP. - IN.

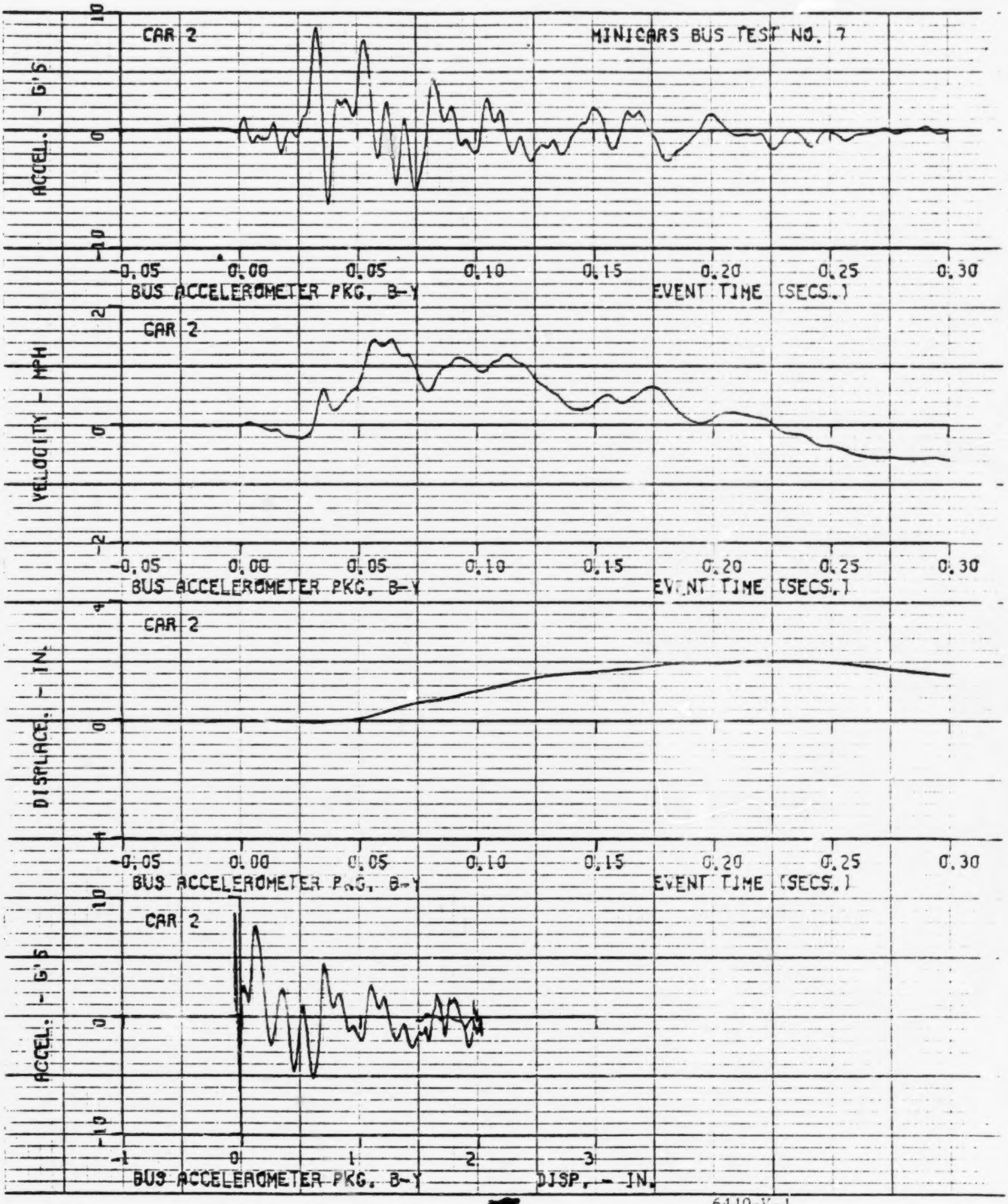
6440-V-4


CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. B-X
EVENT TIME (SECS.)


CAR 2
VELOCITY - MPH
0
-4
-8
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. B-X
EVENT TIME (SECS.)

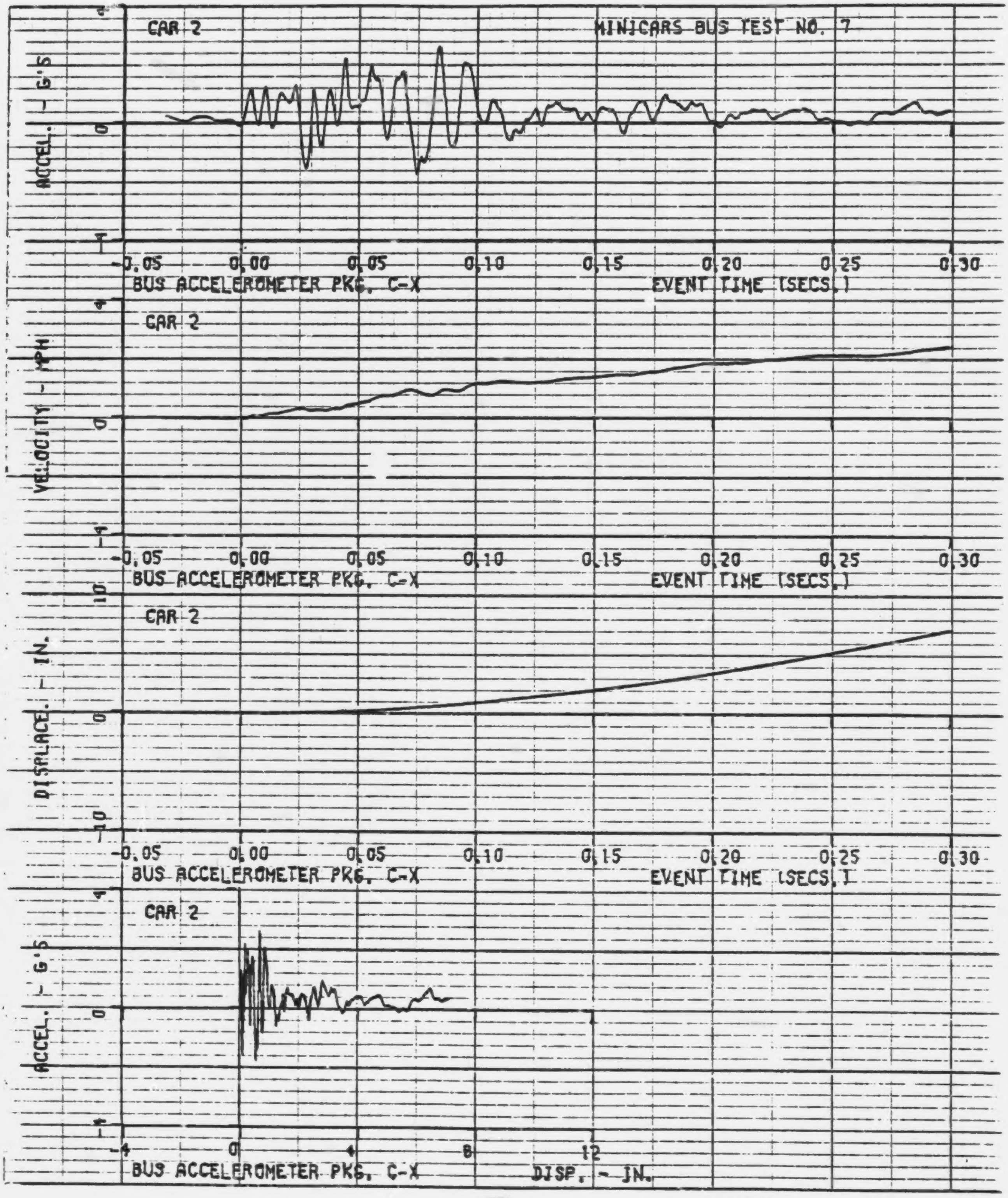

CAR 2
DISPLACE. - IN.
0
-20
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. B-X
EVENT TIME (SECS.)

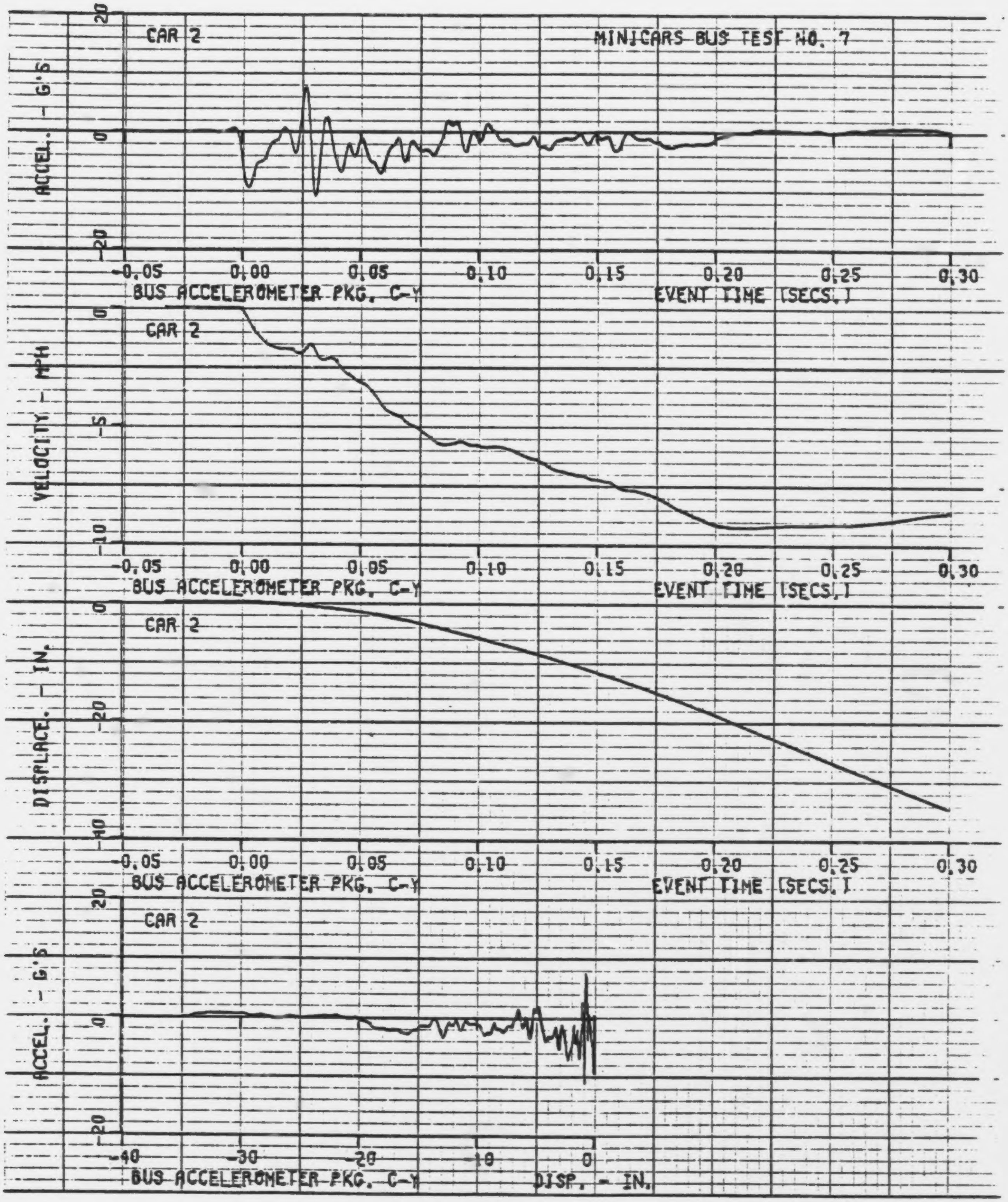

CAR 2
ACCEL. - G'S
10
0
-10
-30
-20
-10
0
10
BUS ACCELEROMETER PKG. B-X
DISP. - IN.

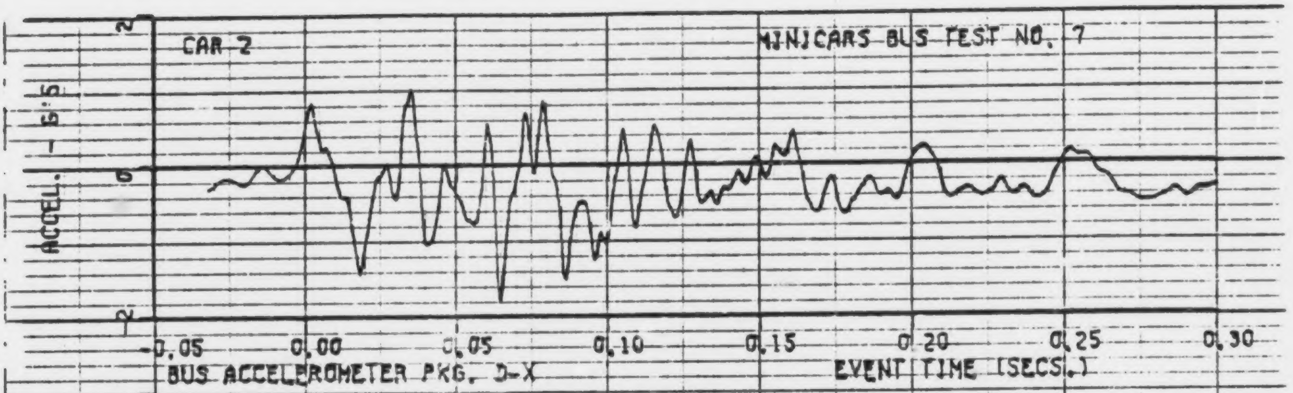

MINICARS BUS TEST NO. 7
CAR 2
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. B-Y
EVENT TIME (SECS.)
CAR 2
VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. B-Y
EVENT TIME (SECS.)
CAR 2
DISPLACE. - IN.
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. B-Y
EVENT TIME (SECS.)
CAR 2
ACCEL. - G'S
10
0
-10
-1
0
1
2
3
BUS ACCELEROMETER PKG. B-Y
DISP. - IN.

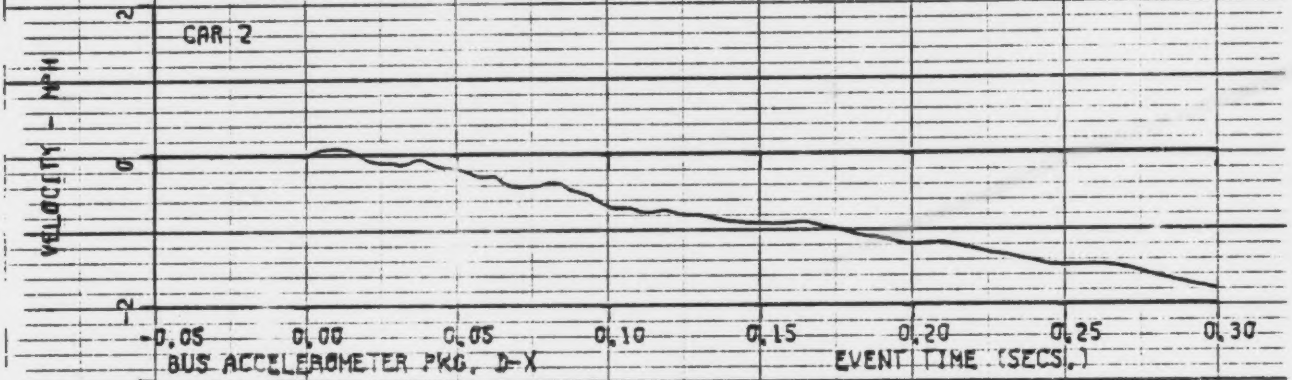
6440-V-4

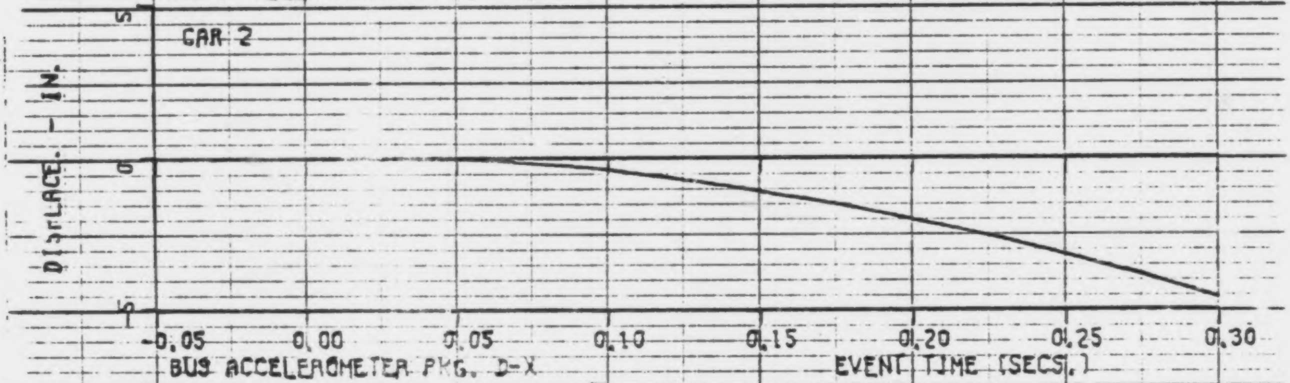
521

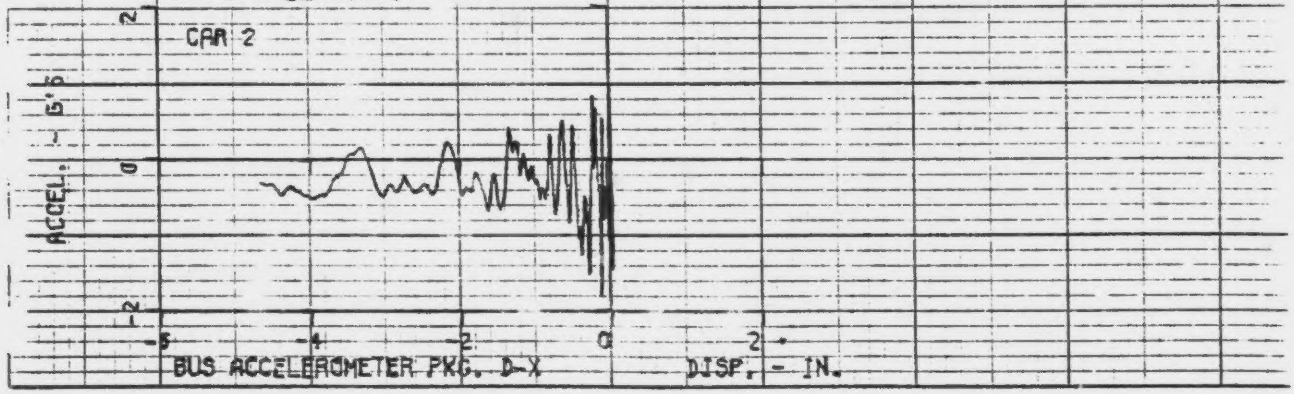

CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-X
EVENT TIME (SECS.)
CAR 2
VELOCITY - MPH
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-X
EVENT TIME (SECS.)
CAR 2
DISPLACE. - IN.
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-X
EVENT TIME (SECS.)
CAR 2
ACCEL. - G'S
4
0
-4
-4
0
4
8
12
BUS ACCELEROMETER PKG. C-X
DISP. - IN.

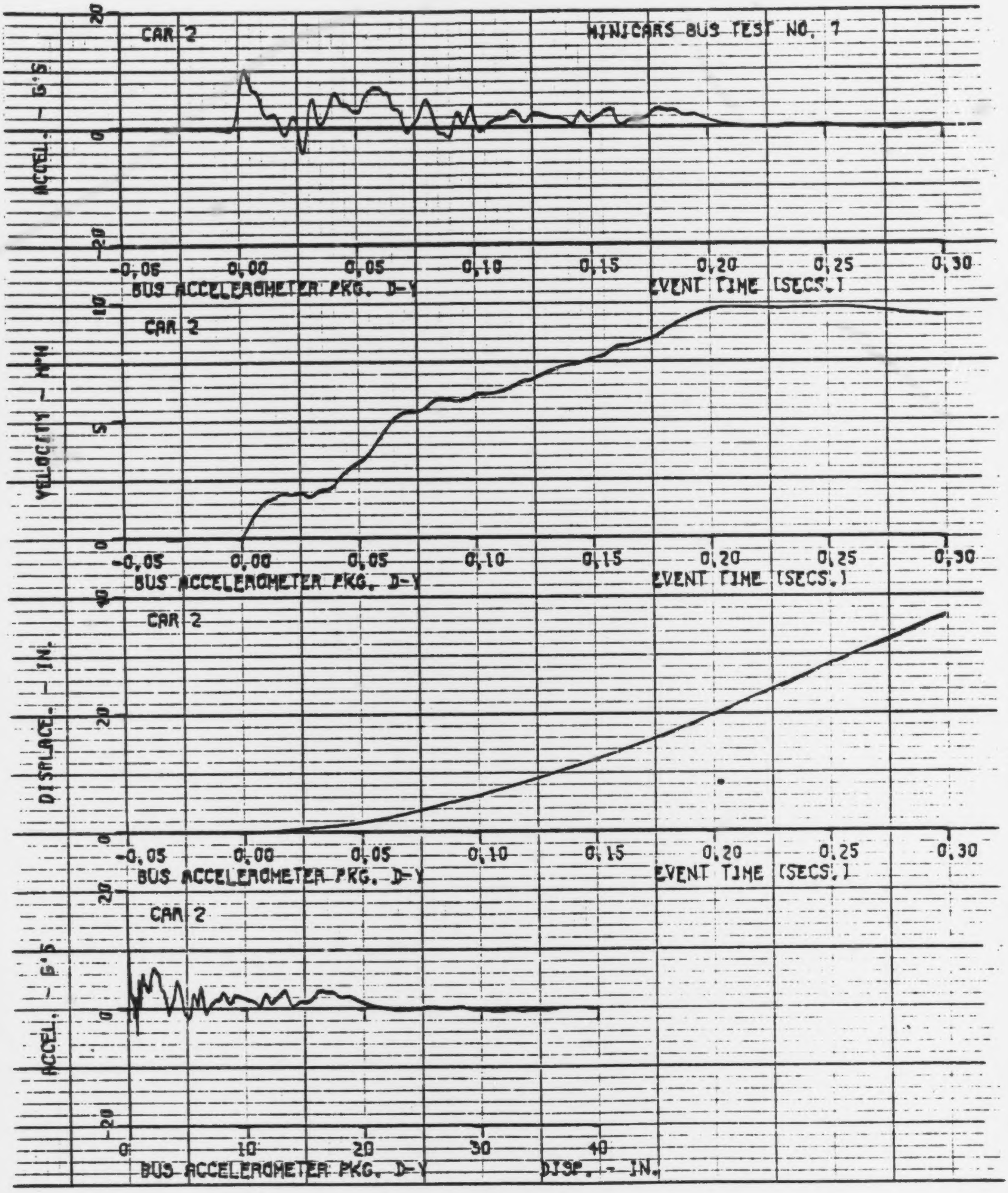

MINICARS BUS TEST NO. 7
CAR 2
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-Y
EVENT TIME (SECS.)
CAR 2
VELOCITY - MPH
0
-5
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-Y
EVENT TIME (SECS.)
CAR 2
DISPLACE. - IN.
0
-20
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. C-Y
EVENT TIME (SECS.)
CAR 2
ACCEL. - G'S
20
0
-20
-40
-30
-20
-10
0
BUS ACCELEROMETER PKG. C-Y
DISP. - IN.


CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. D-X
EVENT TIME (SECS.)


CAR 2
VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. D-X
EVENT TIME (SECS.)


CAR 2
DISPLACE. - IN.
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. D-X
EVENT TIME (SECS.)


CAR 2
ACCEL. - G'S
2
0
-2
-6
-4
-2
0
2
BUS ACCELEROMETER PKG. D-X
DISP. - IN.


MINICARS BUS TEST NO. 7
CAR 2
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. D-Y
EVENT TIME (SECS.)
CAR 2
VELOCITY - MPH
10
5
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. D-Y
EVENT TIME (SECS.)
CAR 2
DISPLACE. - IN.
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
BUS ACCELEROMETER PKG. D-Y
EVENT TIME (SECS.)
CAR 2
ACCEL. - G'S
20
0
-20
0
10
20
30
40
BUS ACCELEROMETER PKG. D-Y
DISP. - IN.

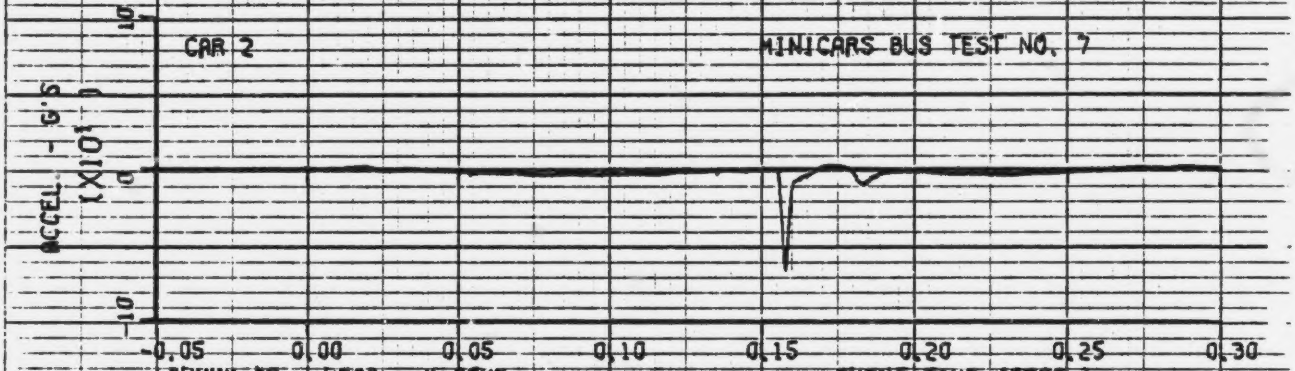
6440-V-4

BLANK PAGE

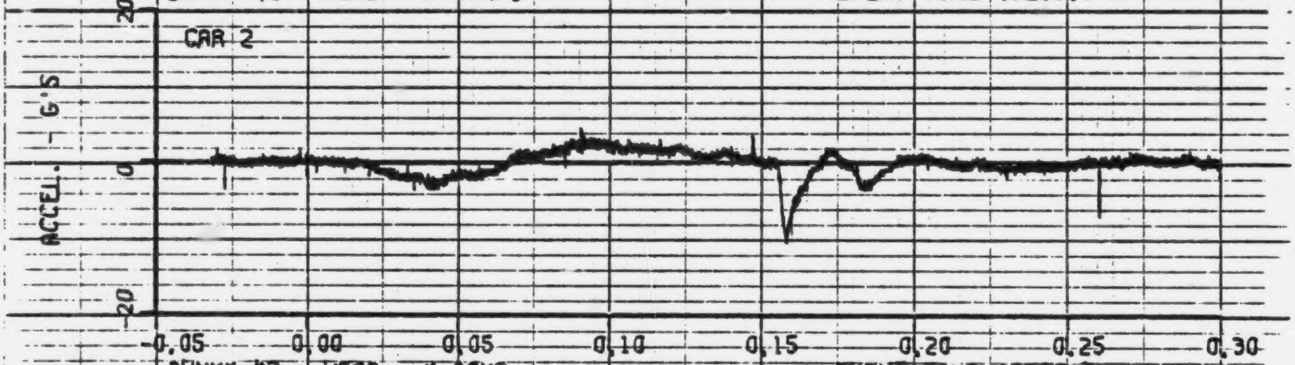
DUMMY DATA

527

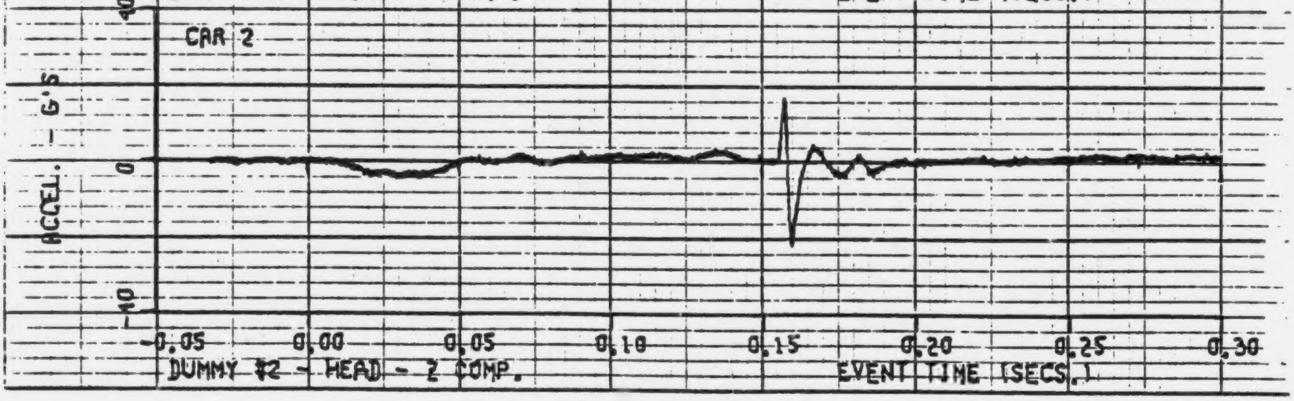
MINICARS BUS TEST NO. 7



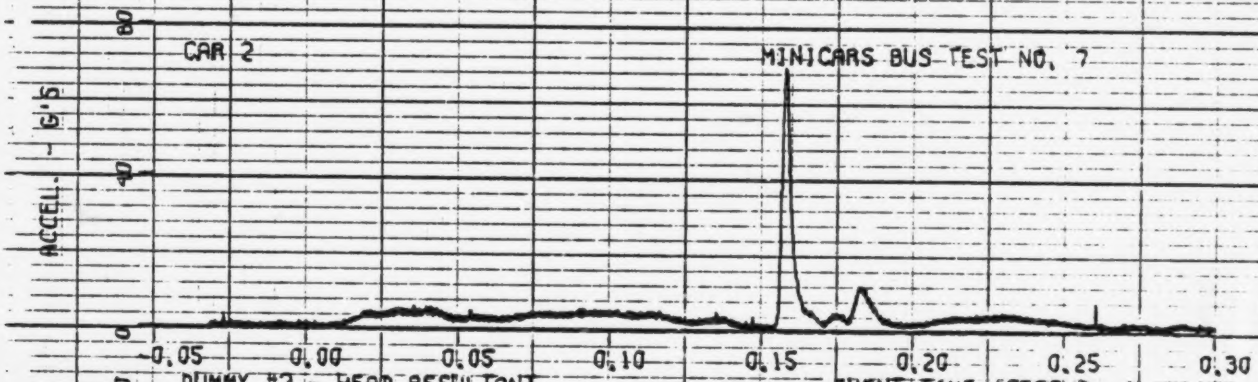
DUMMY #2 - HEAD - X COMP. EVENT TIME (SECS.)



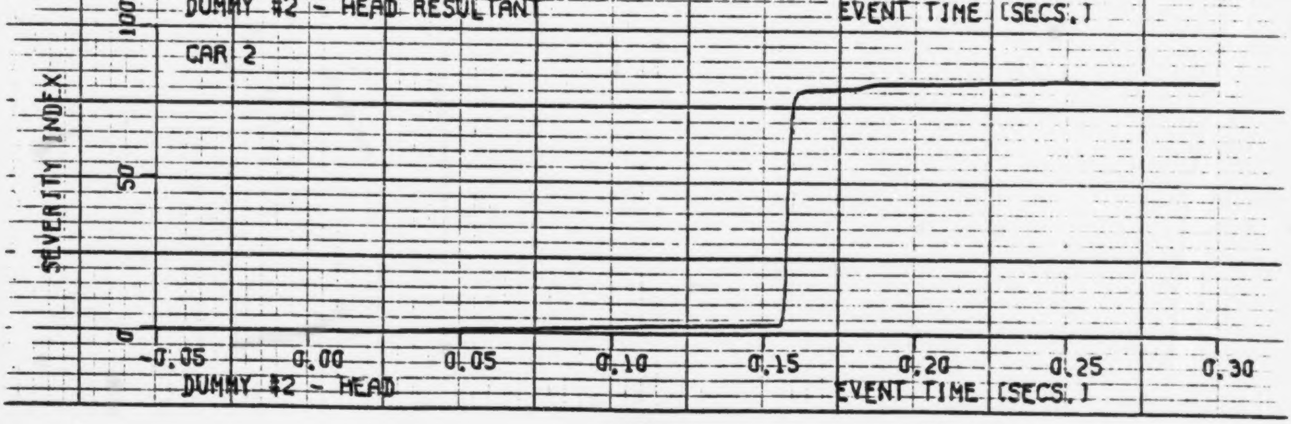
DUMMY #2 - HEAD - Y COMP. EVENT TIME (SECS.)



DUMMY #2 - HEAD - Z COMP. EVENT TIME (SECS.)

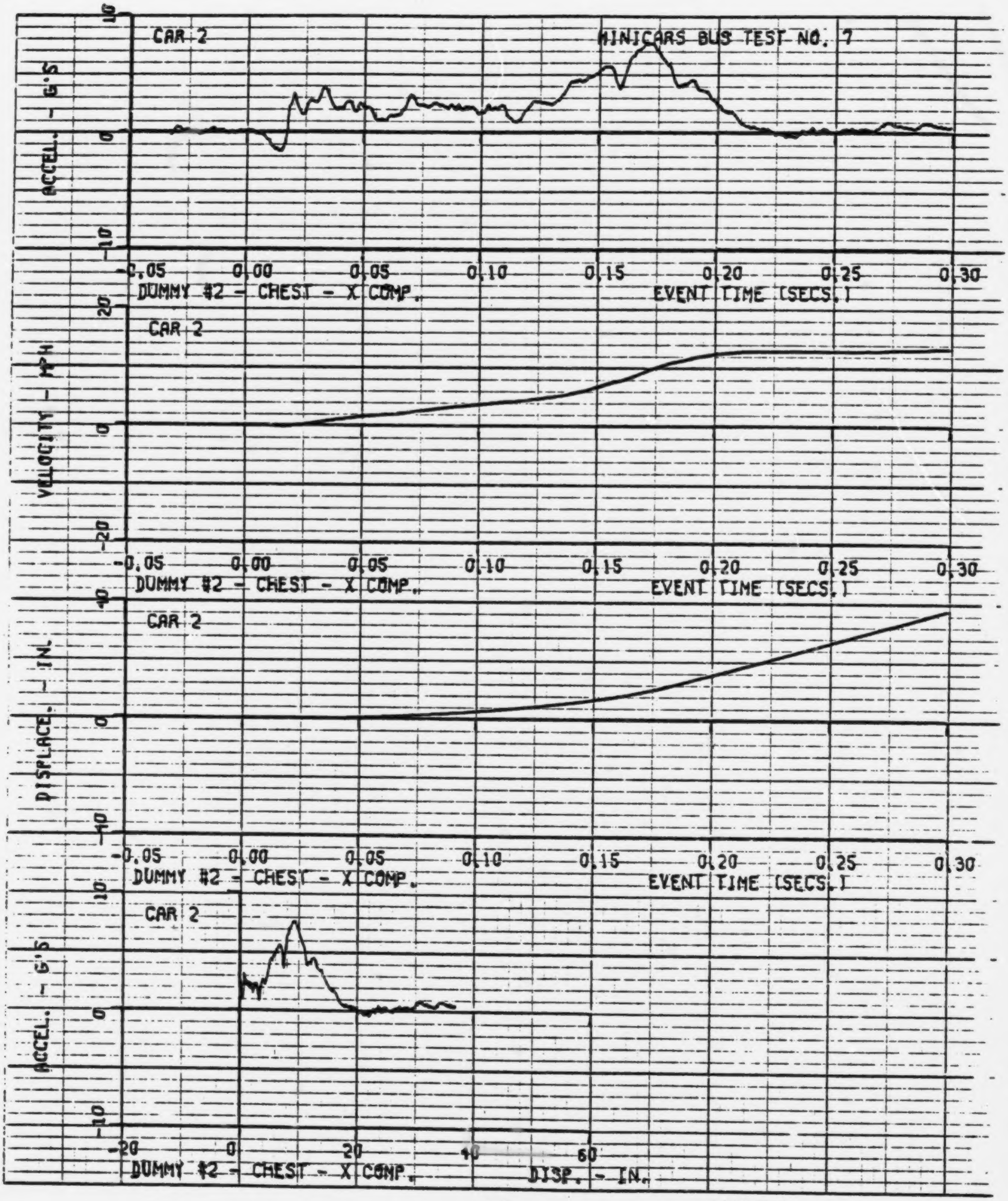


DUMMY #2 - HEAD RESULTANT

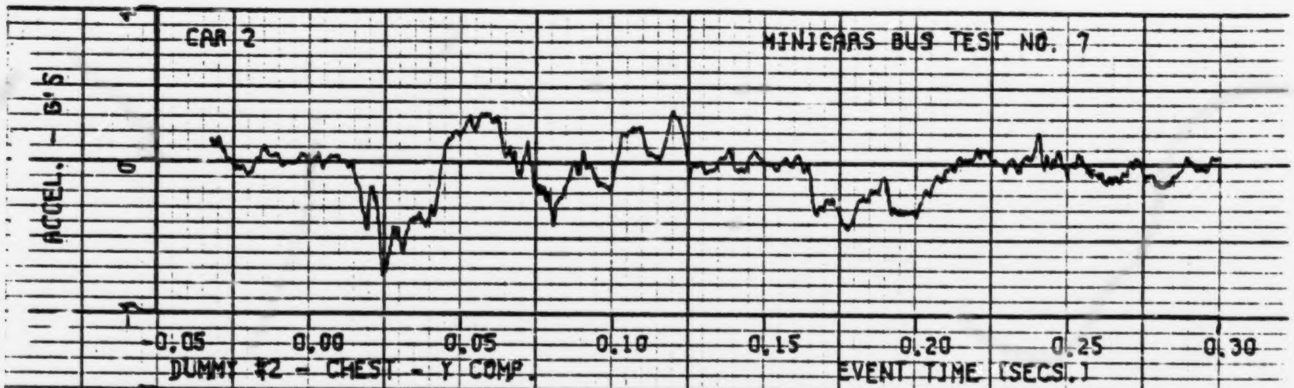


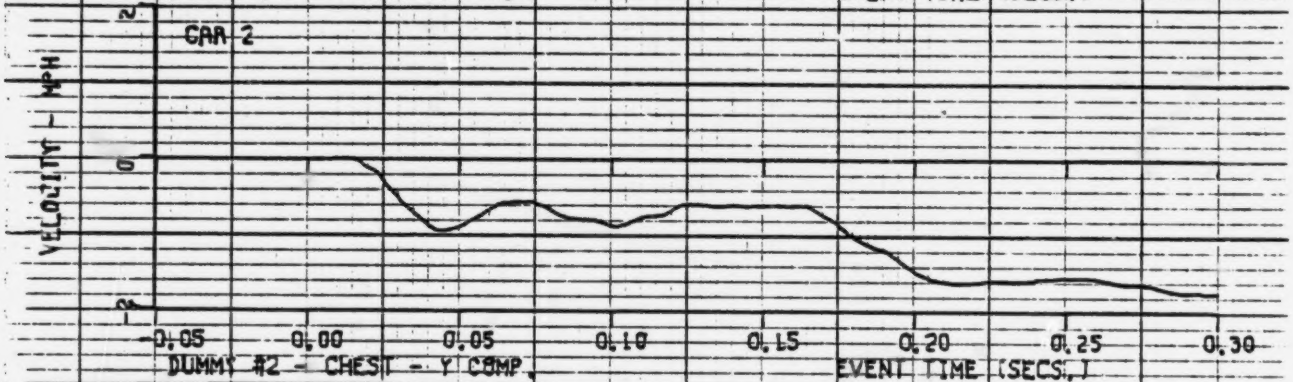
DUMMY #2 - HEAD

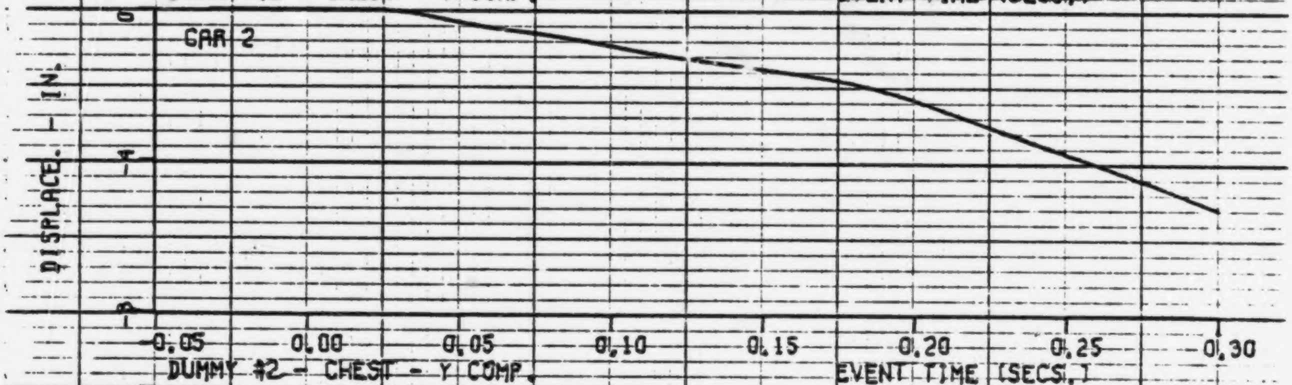
6440-V-4

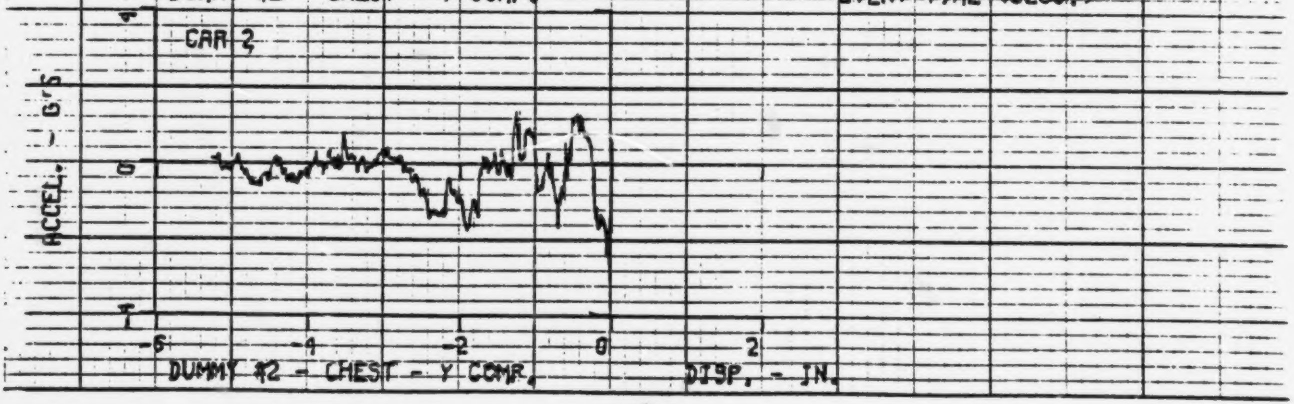

CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - X COMP.
EVENT TIME (SECS.)
CAR 2
VELOCITY - MPH
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - X COMP.
EVENT TIME (SECS.)
CAR 2
DISPLACE. - IN.
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - X COMP.
EVENT TIME (SECS.)
CAR 2
ACCEL. - G'S
10
0
-10
-20
0
20
40
60
DUMMY #2 - CHEST - X COMP.
DISP. - IN.

6440-V-4

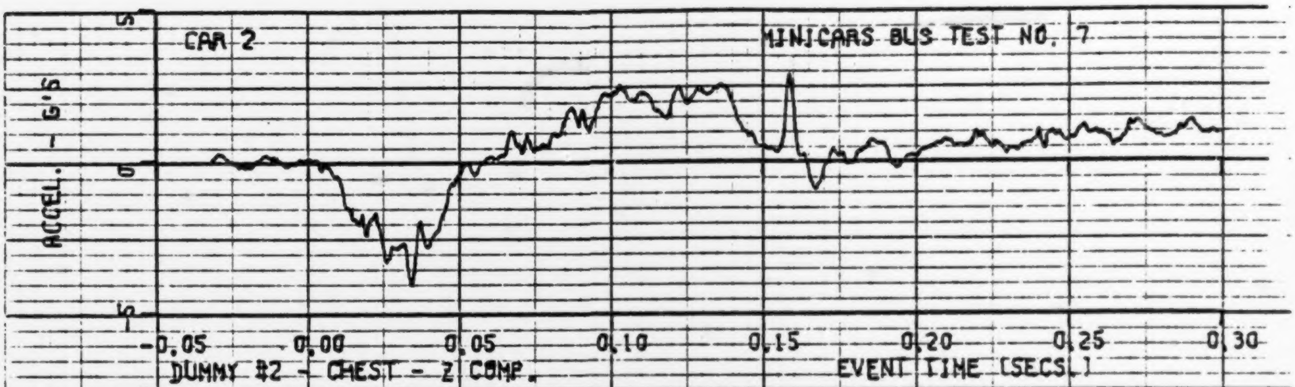

CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - Y COMP.
EVENT TIME (SECS.)

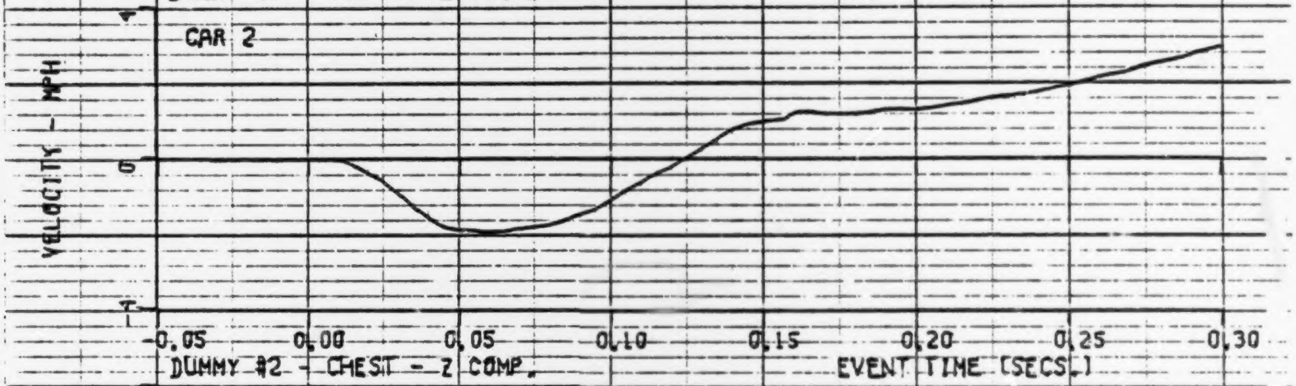

CAR 2
VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - Y COMP.
EVENT TIME (SECS.)

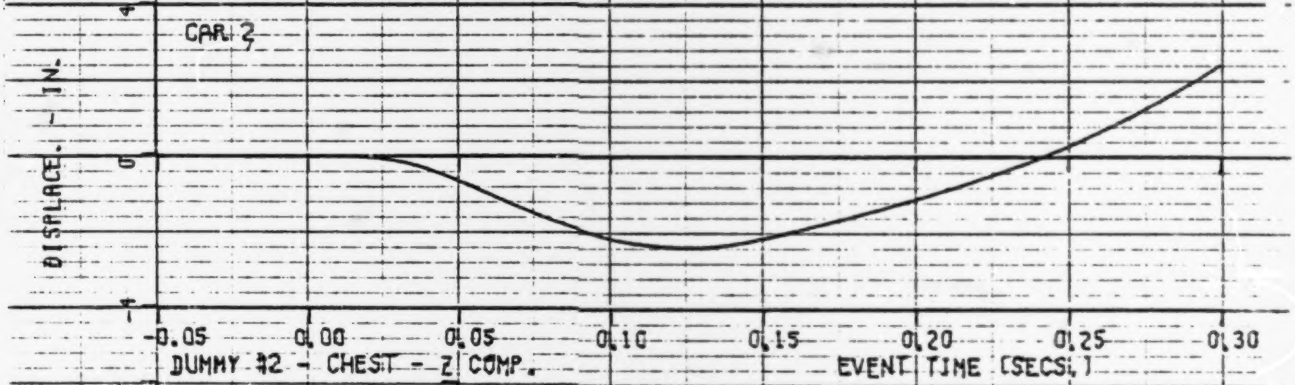

CAR 2
DISPLACE. - IN.
0
-4
-8
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - Y COMP.
EVENT TIME (SECS.)

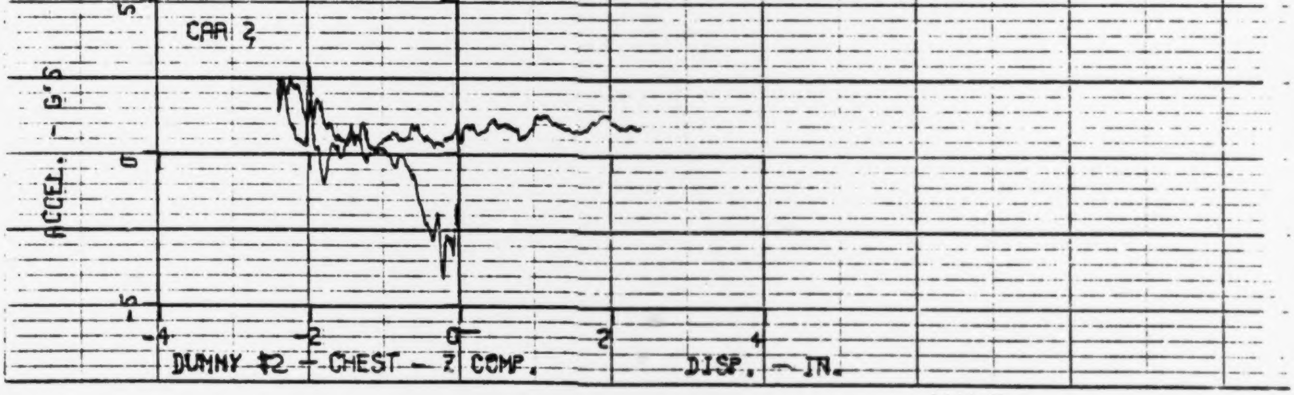

CAR 2
ACCEL. - G'S
4
0
-4
-6
-4
-2
0
2
DUMMY #2 - CHEST - Y COMP.
DISP. - IN.

6440-V-4

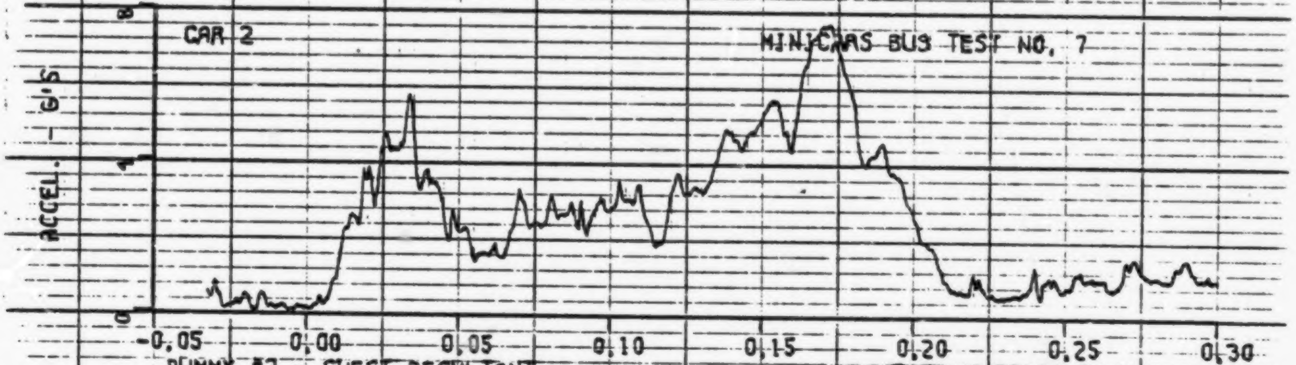

CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - Z COMP.
EVENT TIME (SECS.)


CAR 2
VELOCITY - MPH
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - Z COMP.
EVENT TIME (SECS.)

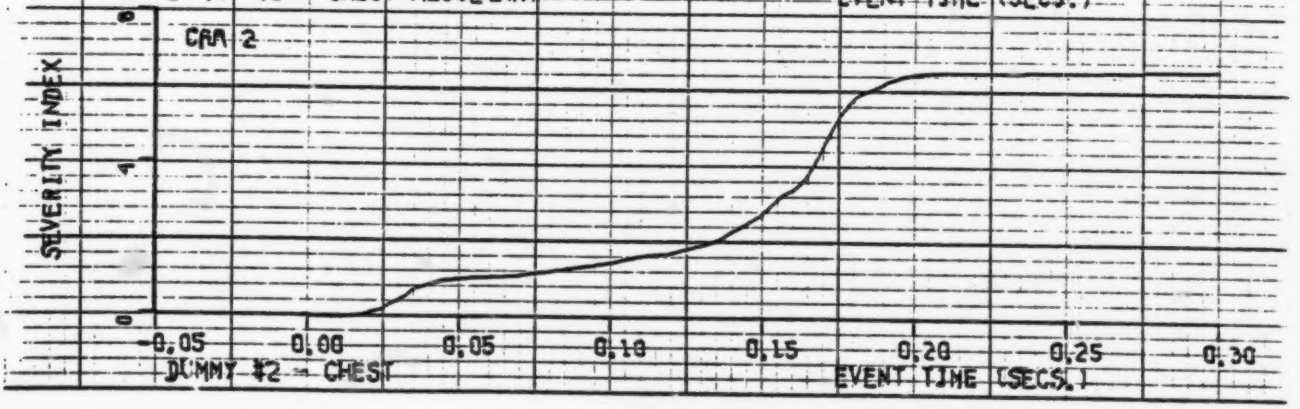

CAR 2
DISPLACE. - IN.
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #2 - CHEST - Z COMP.
EVENT TIME (SECS.)


CAR 2
ACCEL. - G'S
5
0
-5
-4
-2
0
2
4
DUMMY #2 - CHEST - Z COMP.
DISP. - IN.

6440-V-4

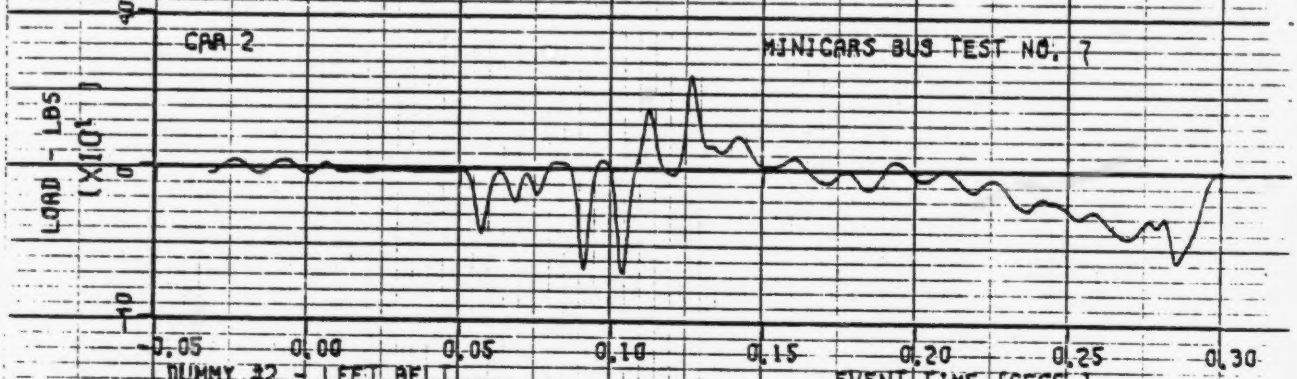


DUMMY #2 - CHEST RESULTANT

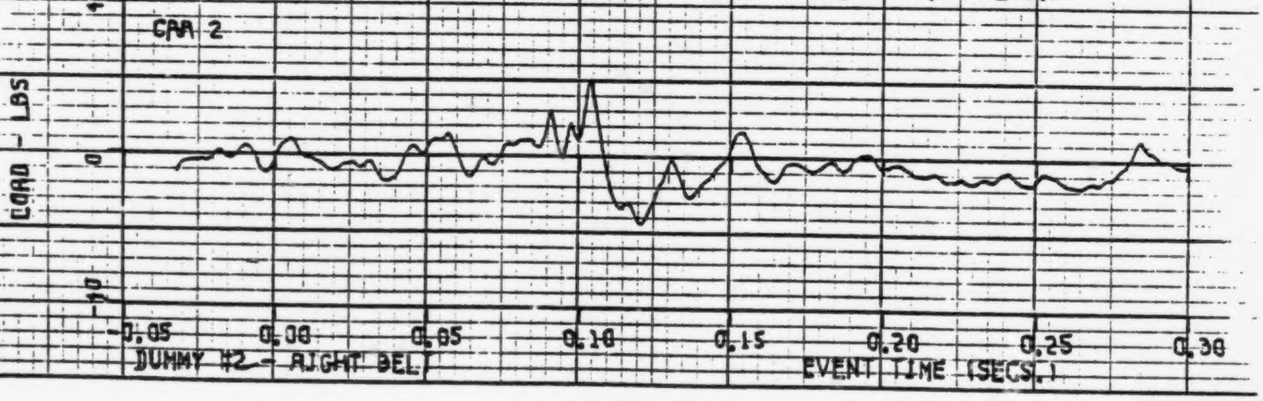


DUMMY #2 - CHEST

6440-V-4



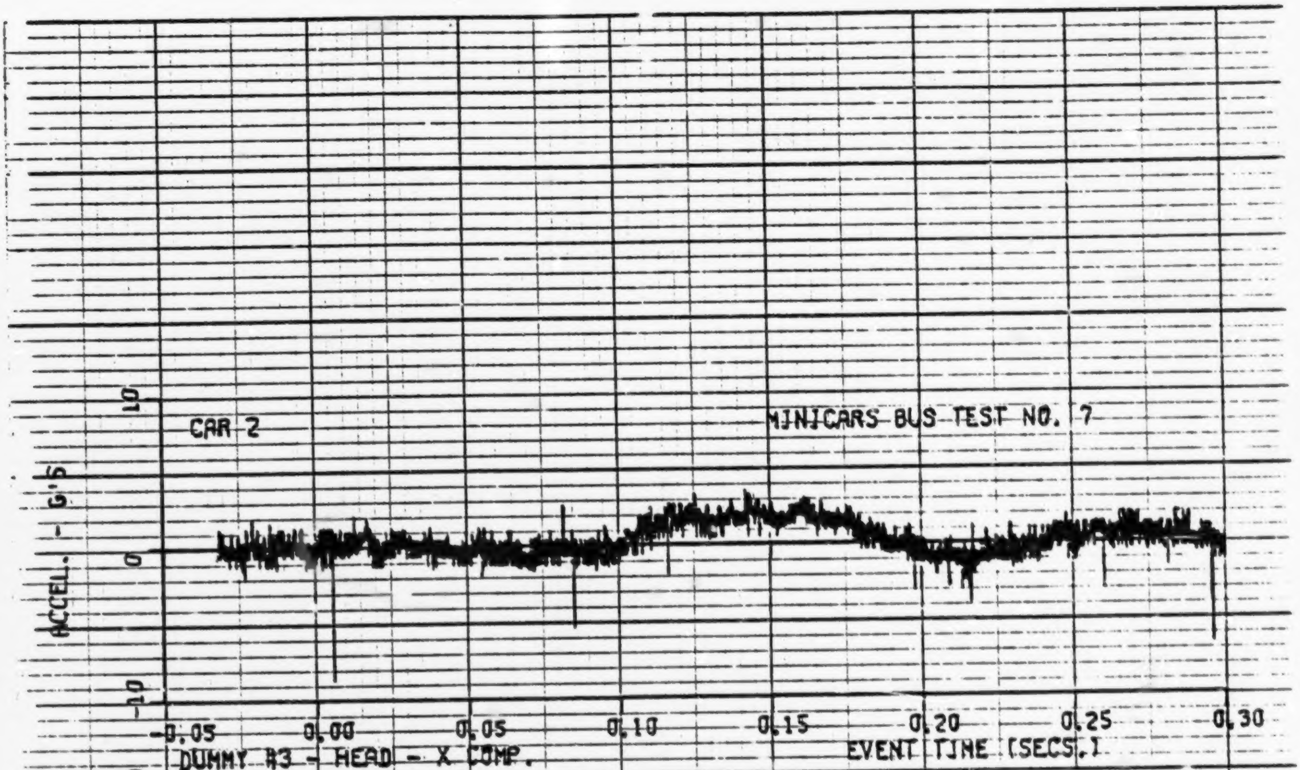
DUMMY #2 - LEFT BELT

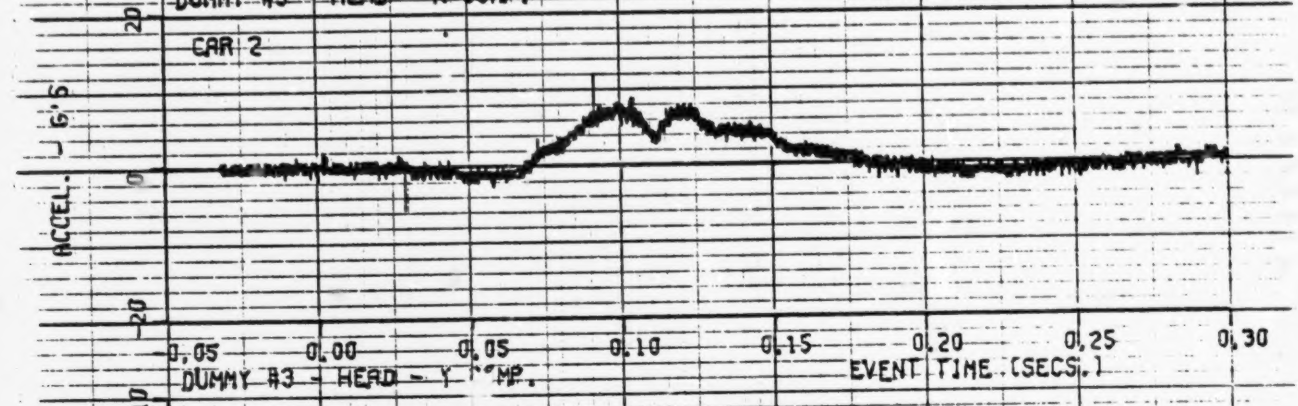


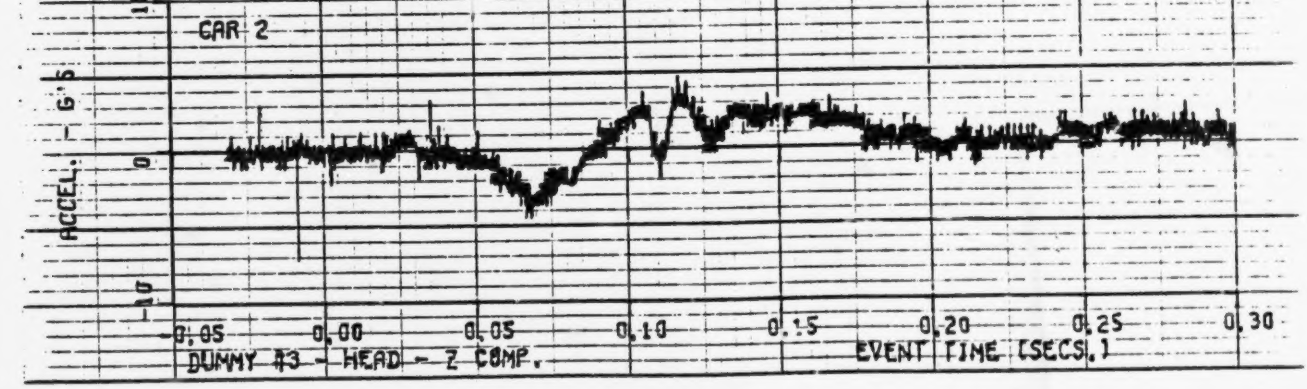
DUMMY #2 - RIGHT BELT

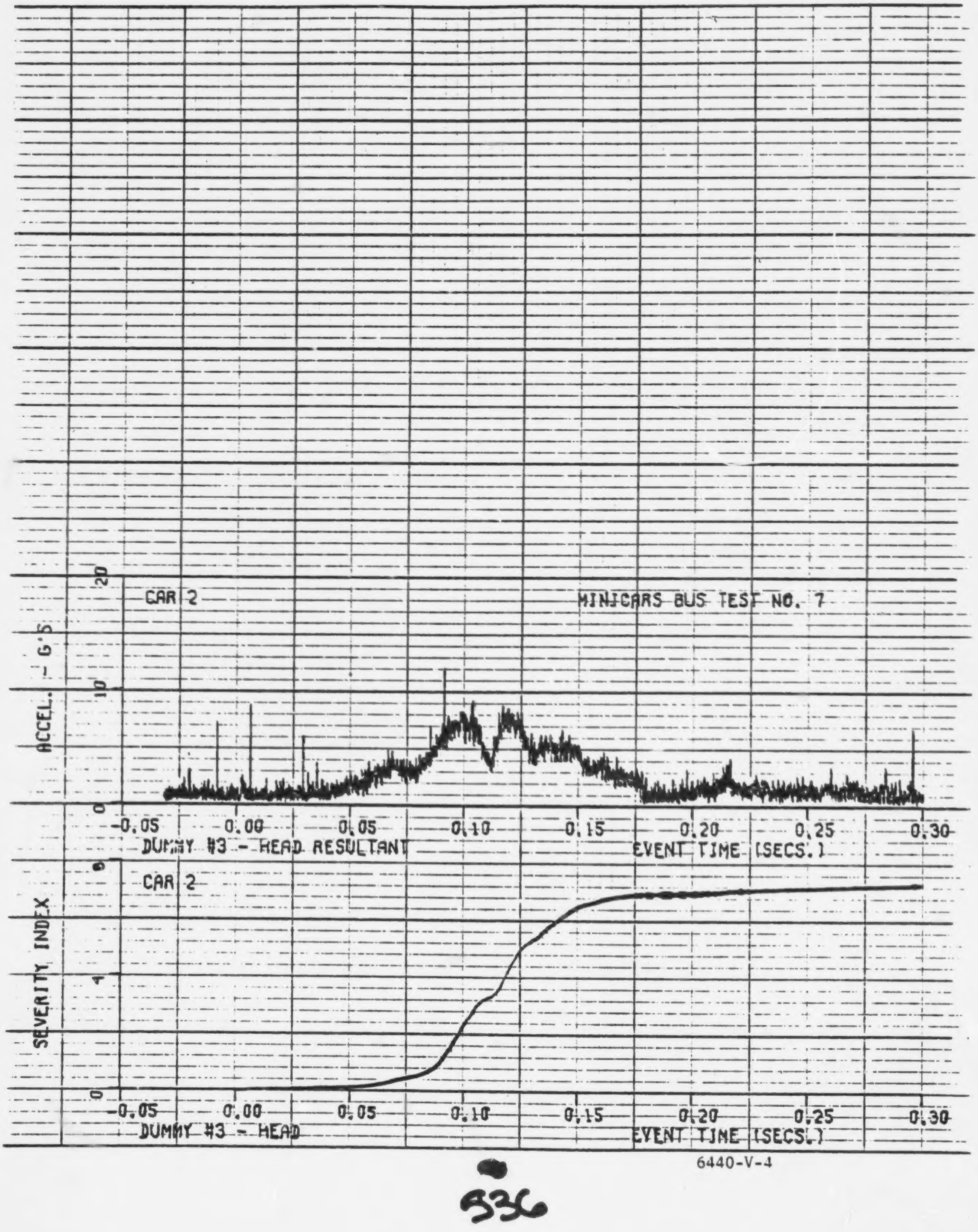
6440-V-4

534

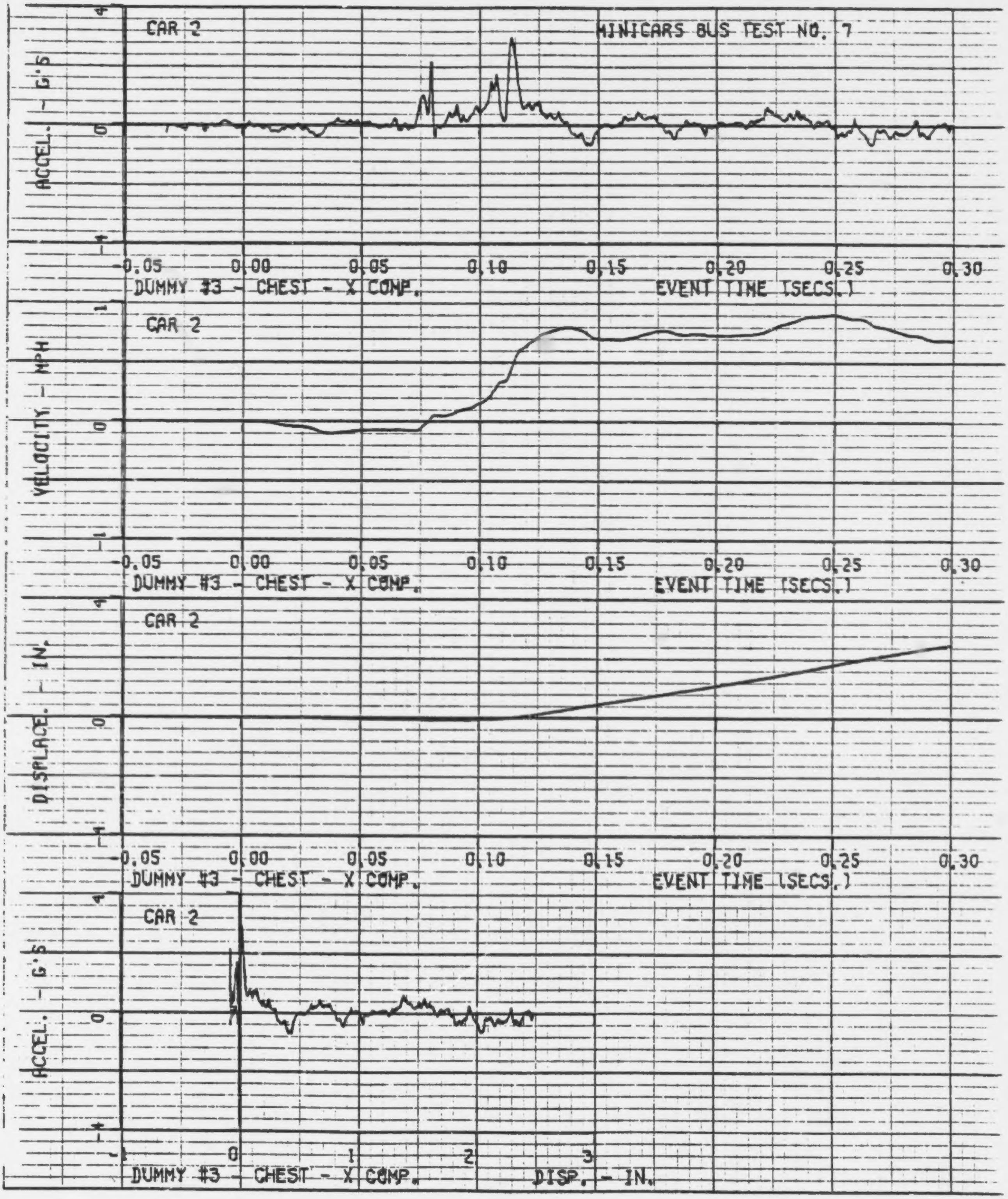

MINICARS BUS TEST NO. 7
CAR 2
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
DUMMY #3 - HEAD - X COMP.


CAR 2
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
DUMMY #3 - HEAD - Y COMP.

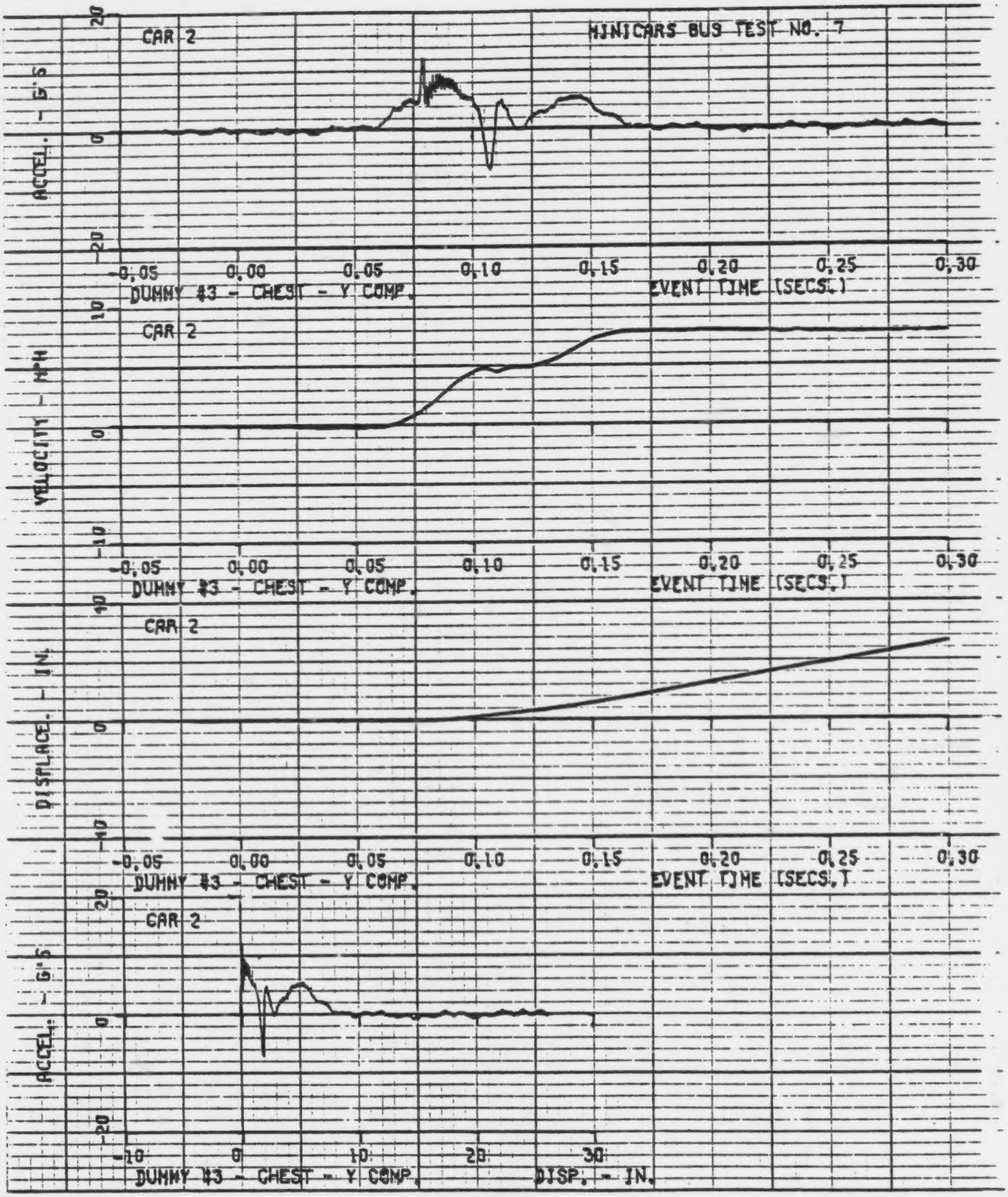

CAR 2
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
EVENT TIME (SECS.)
DUMMY #3 - HEAD - Z COMP.


CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - HEAD RESULTANT
EVENT TIME (SECS.)
CAR 2
SEVERITY INDEX
8
4
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - HEAD
EVENT TIME (SECS.)

6440-V-4

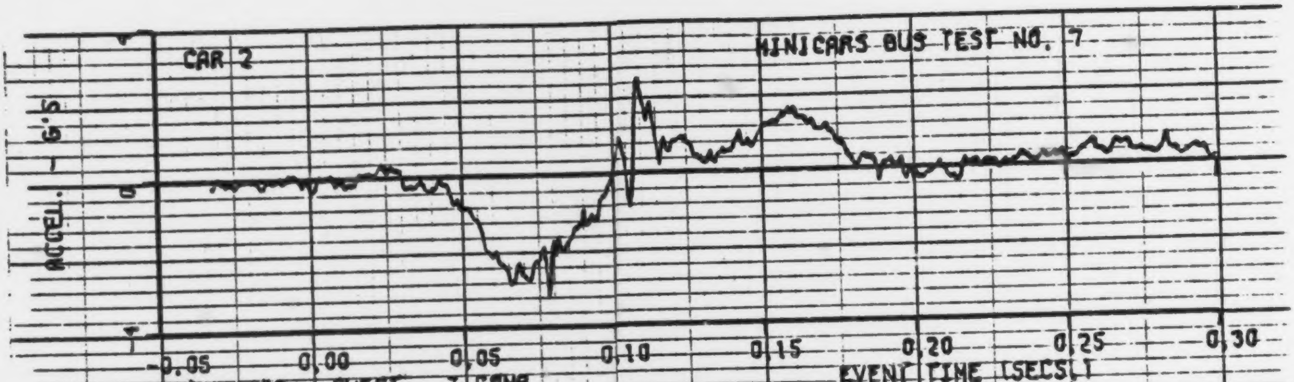

MINICARS BUS TEST NO. 7
CAR 2
ACCEL. - G'S
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - X COMP.
EVENT TIME (SECS.)
CAR 2
VELOCITY - MPH
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - X COMP.
EVENT TIME (SECS.)
CAR 2
DISPLACE. - IN.
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - X COMP.
EVENT TIME (SECS.)
CAR 2
ACCEL. - G'S
4
0
-4
-1
0
1
2
3
DUMMY #3 - CHEST - X COMP.
DISP. - IN.

6440-V-4

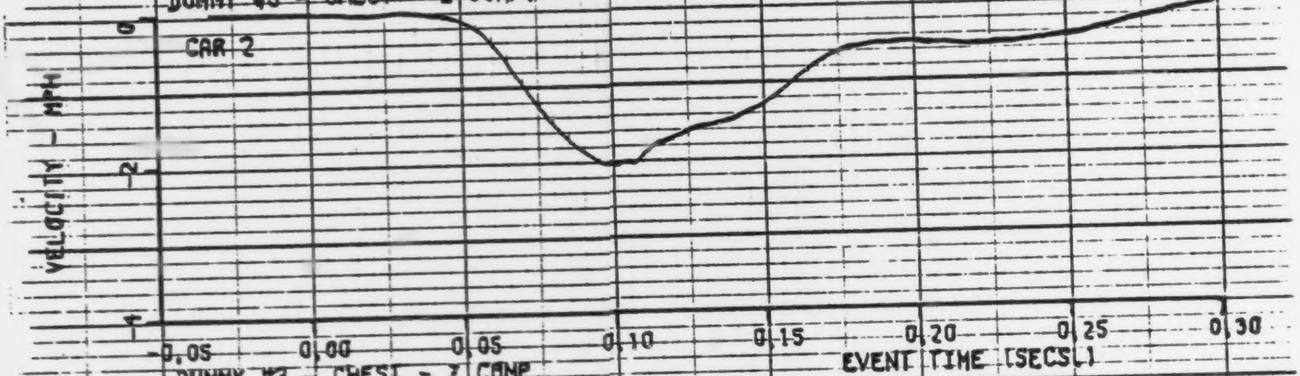

MINICARS BUS TEST NO. 7
CAR 2
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - Y COMP.
EVENT TIME (SECS.)
CAR 2
VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - Y COMP.
EVENT TIME (SECS.)
CAR 2
DISPLACE. - IN.
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST - Y COMP.
EVENT TIME (SECS.)
CAR 2
ACCEL. - G'S
20
0
-20
-10
0
10
20
30
DUMMY #3 - CHEST - Y COMP.
DISP. - IN.

6440-V-4

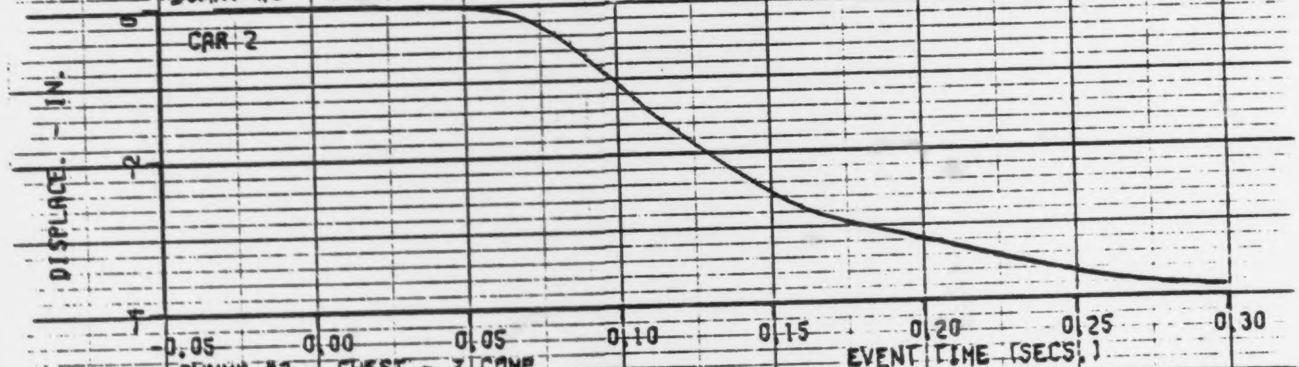
538



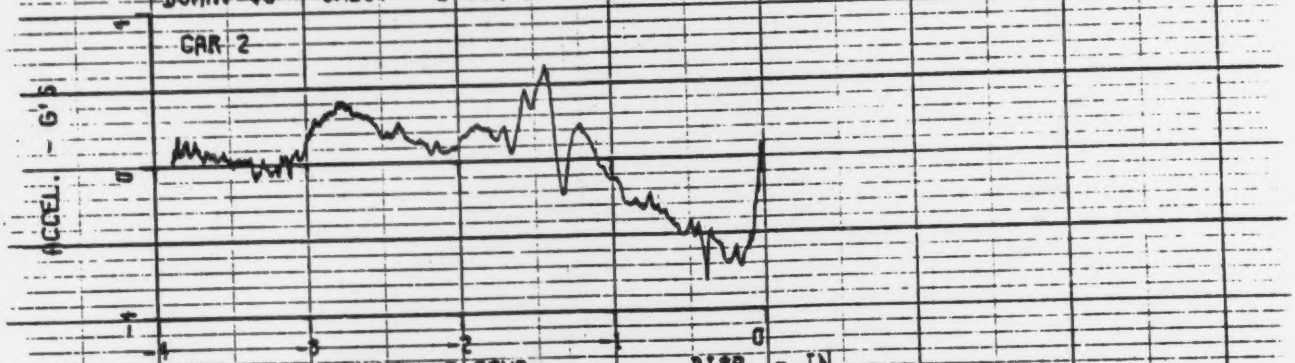
DUMMY #3 - CHEST - Z COMP.



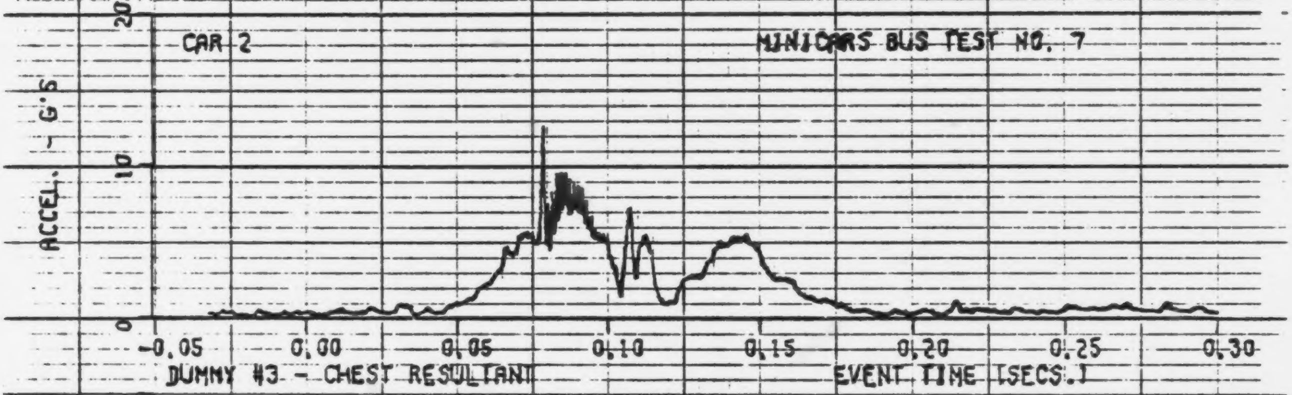
DUMMY #3 - CHEST - Z COMP.

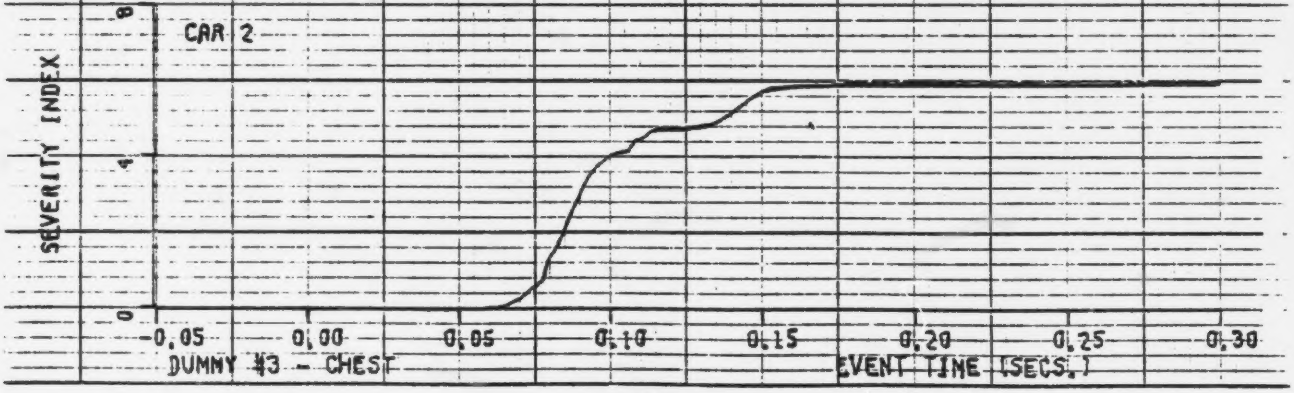


DUMMY #3 - CHEST - Z COMP.

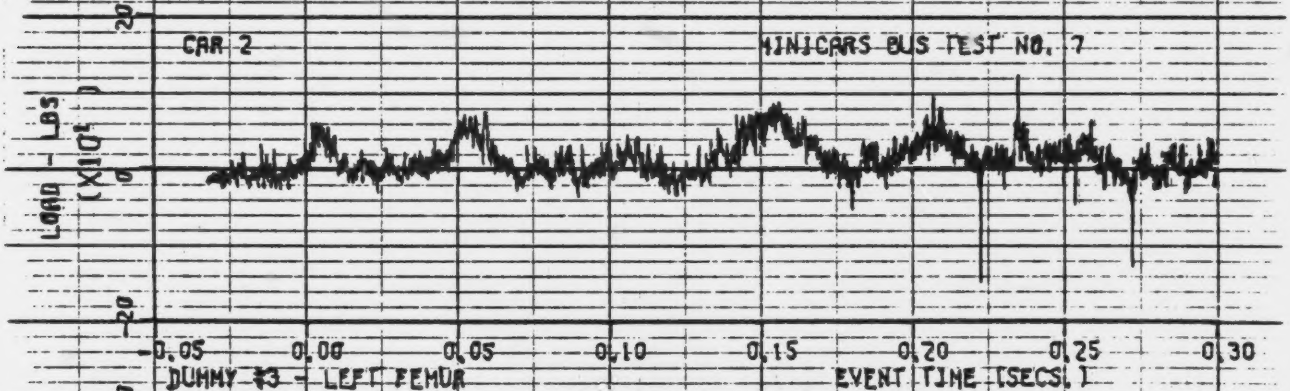


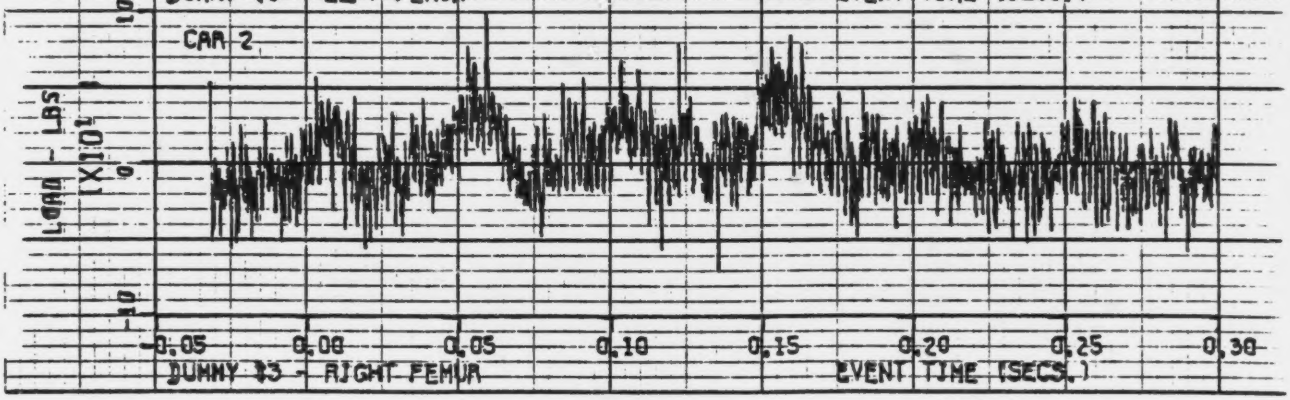
DUMMY #3 - CHEST - Z COMP.


CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST RESULTANT
EVENT TIME (SECS.)


CAR 2
SEVERITY INDEX
8
4
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - CHEST
EVENT TIME (SECS.)

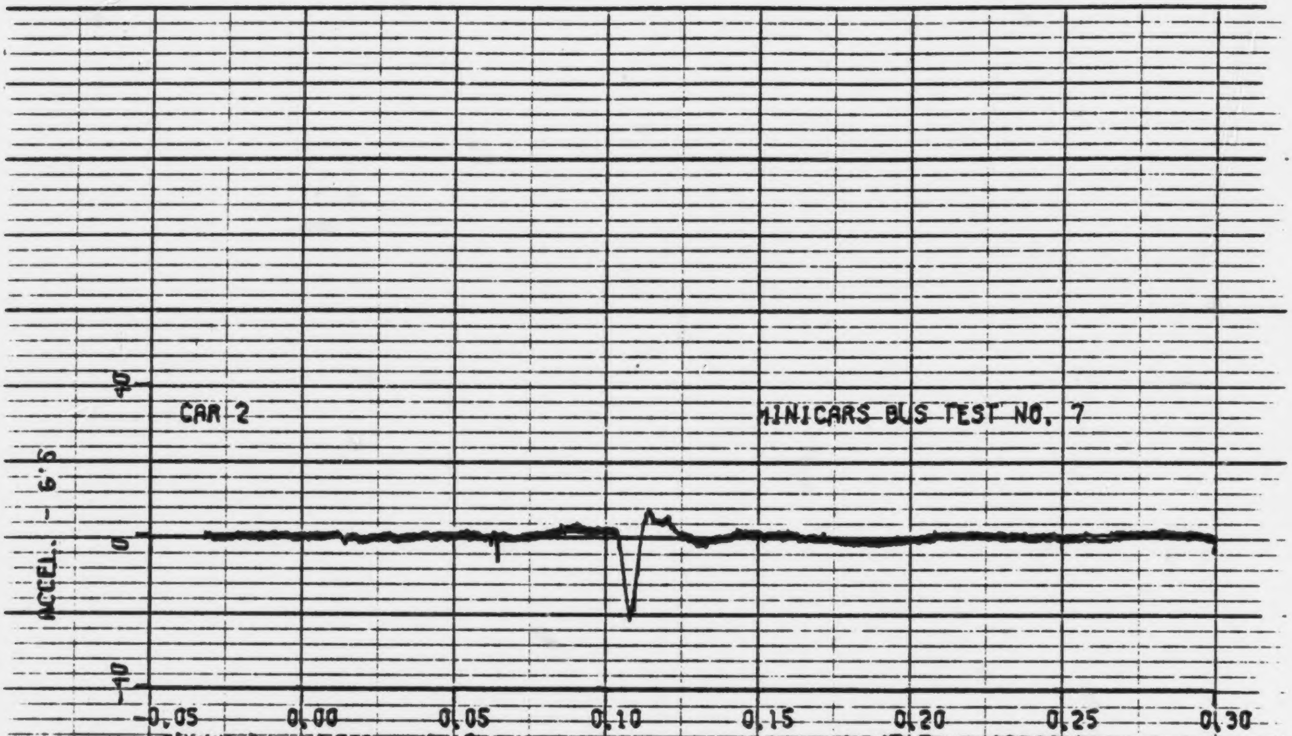
6440-V-4


20
LOAD - LBS
(X10¹)
0
-20
CAR 2
MINICARS BUS TEST NO. 7
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - LEFT FEMUR
EVENT TIME (SECS.)

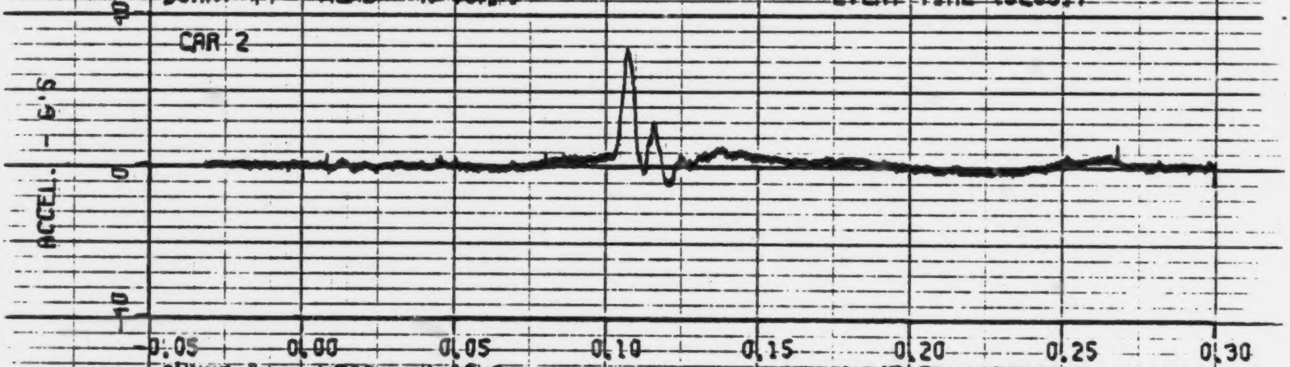

10
LOAD - LBS
(X10¹)
0
-10
CAR 2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #3 - RIGHT FEMUR
EVENT TIME (SECS.)

6440-V-4

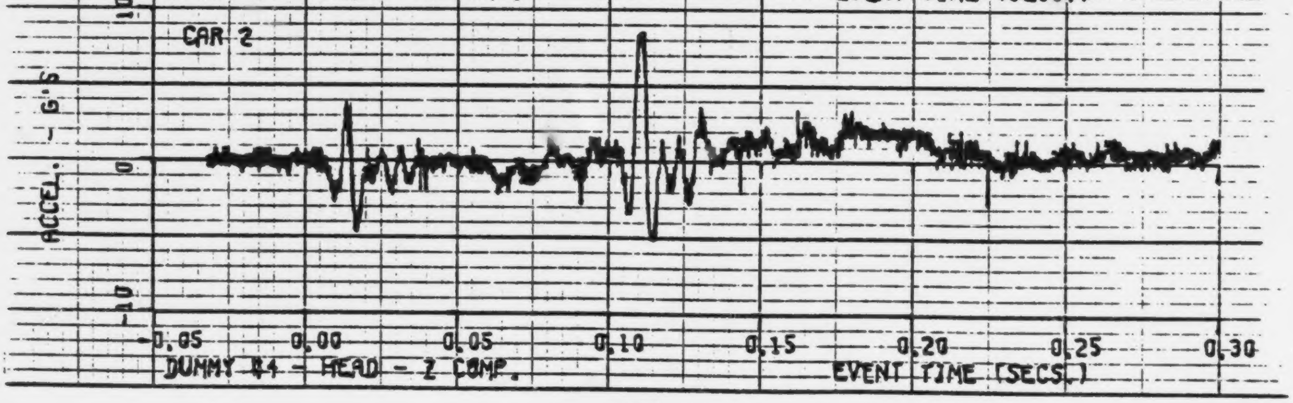
541



DUMMY #4 - HEAD - X COMP. EVENT TIME (SECS.)

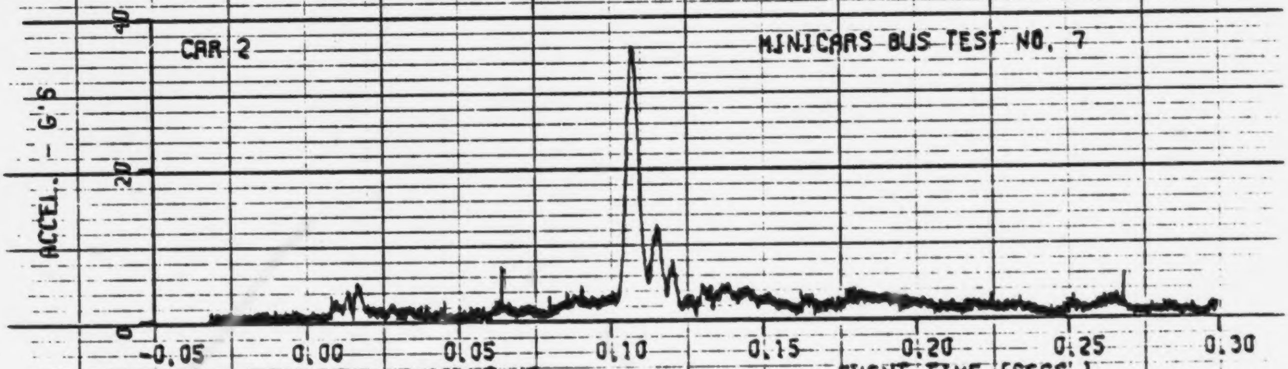


DUMMY #4 - HEAD - Y COMP. EVENT TIME (SECS.)



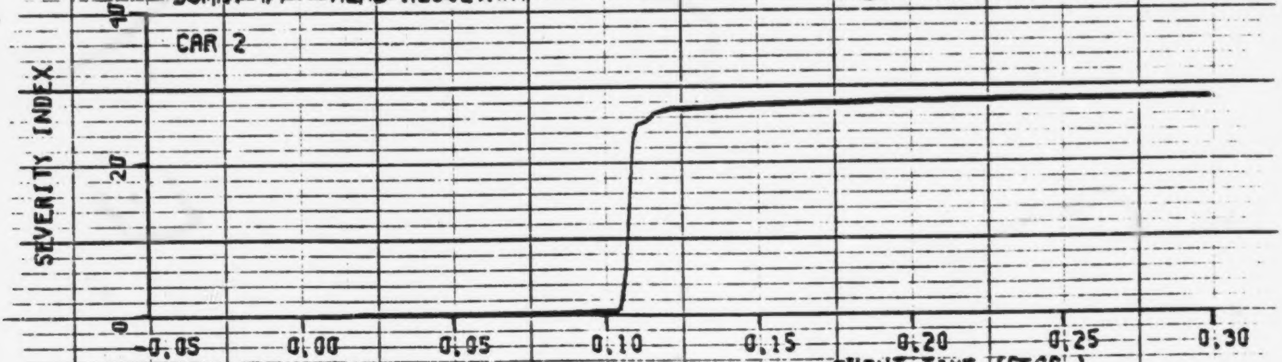
DUMMY #4 - HEAD - Z COMP. EVENT TIME (SECS.)

6440-V-4



DUMMY #4 - HEAD RESULTANT

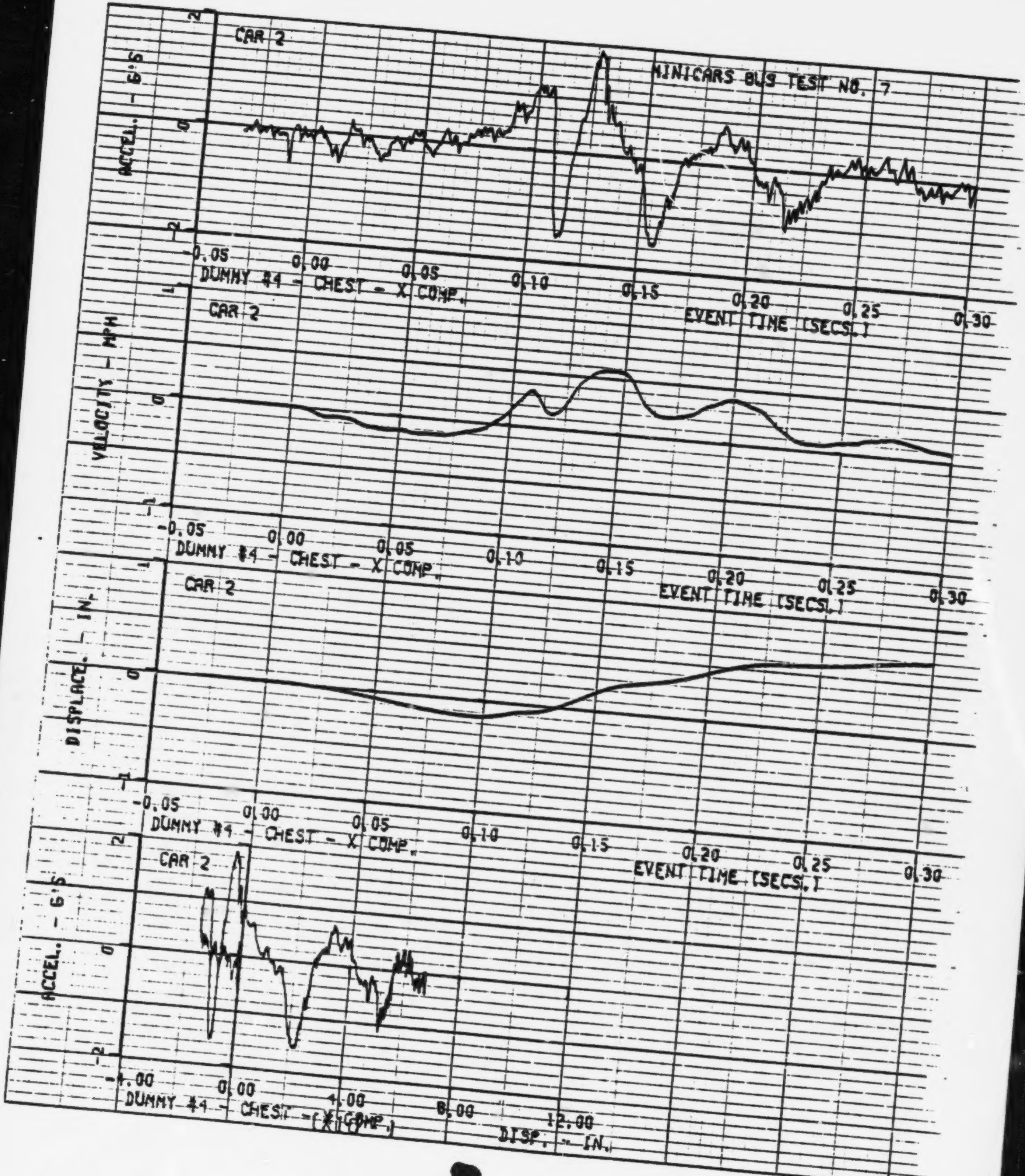
EVENT TIME (SECS.)



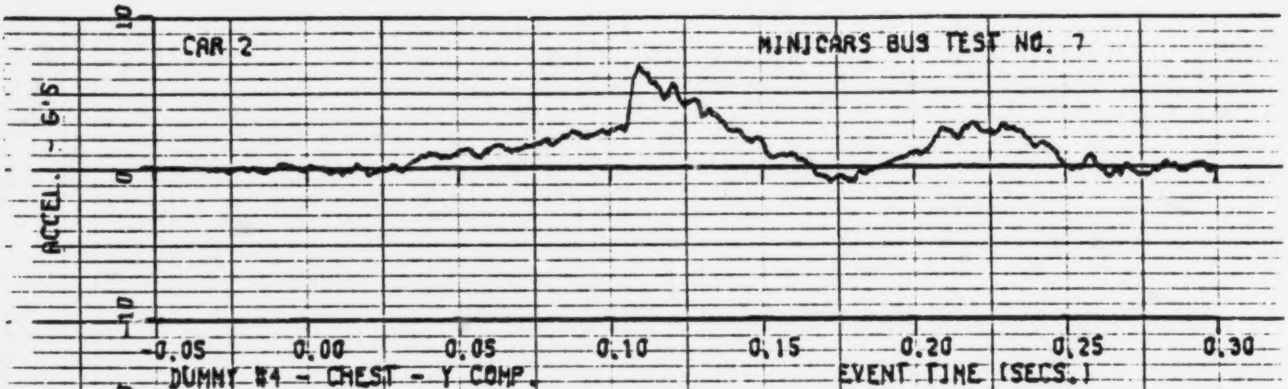
DUMMY #4 - HEAD

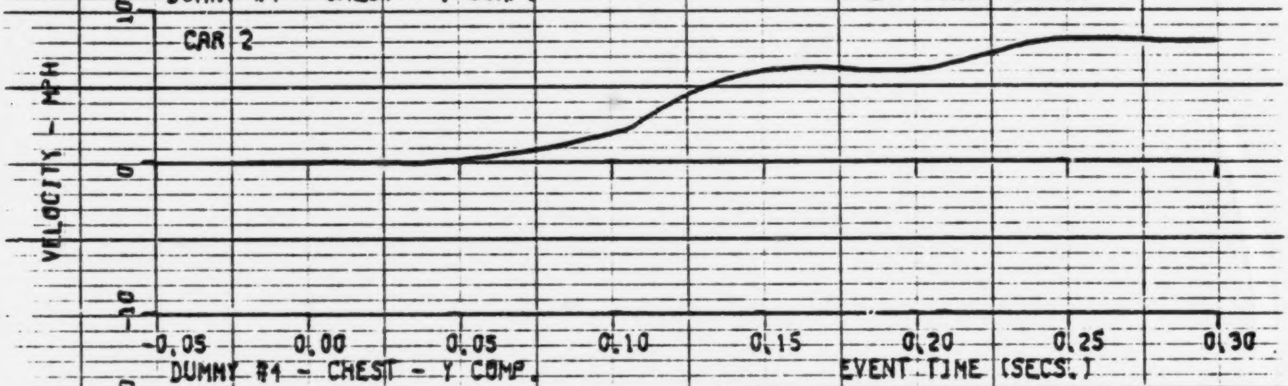
EVENT TIME (SECS.)

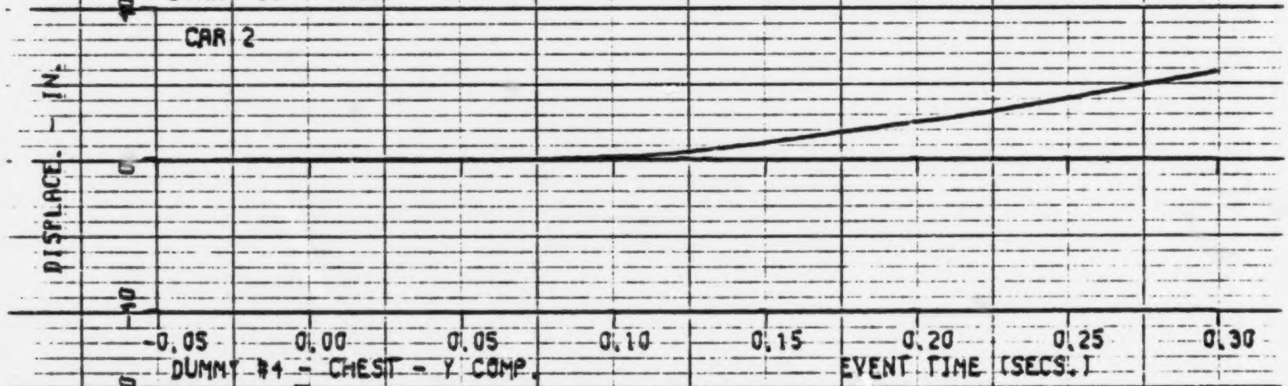
6440-V-4

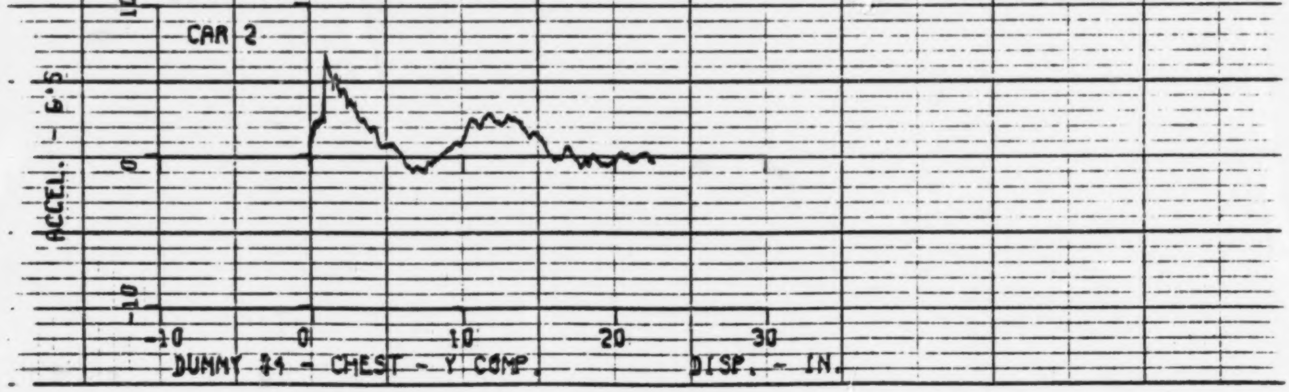


CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - X COMP.
EVENT TIME [SECS.]
CAR 2
VELOCITY - MPH
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - X COMP.
EVENT TIME [SECS.]
CAR 2
DISPLACE. - IN.
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - X COMP.
EVENT TIME [SECS.]
CAR 2
ACCEL. - G'S
2
0
-2
-4.00
0.00
4.00
8.00
12.00
DUMMY #4 - CHEST - X COMP.
(X10)
DISP. - IN.

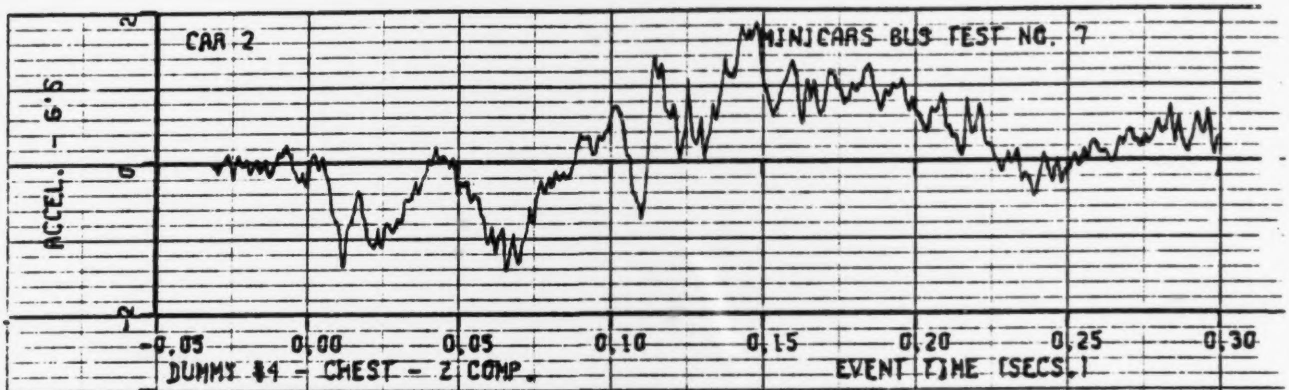

CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Y COMP.
EVENT TIME (SECS.)

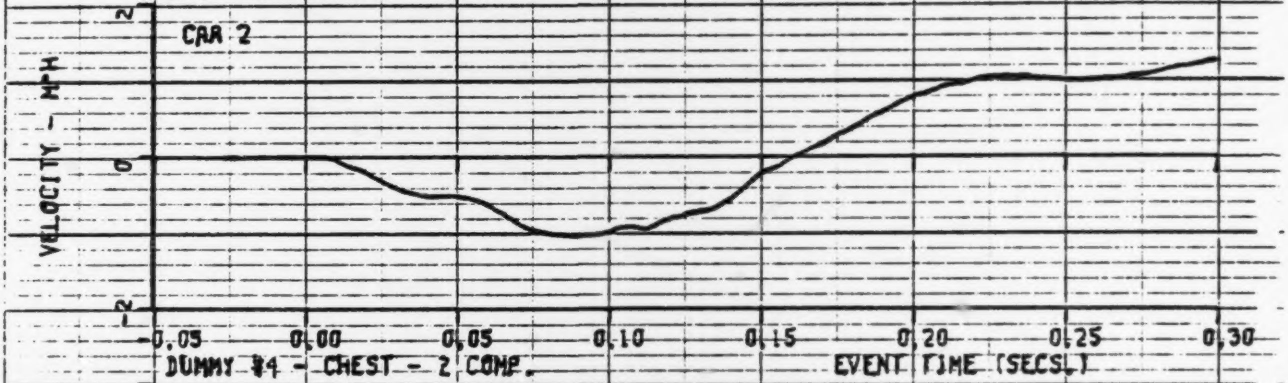

CAR 2
VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Y COMP.
EVENT TIME (SECS.)

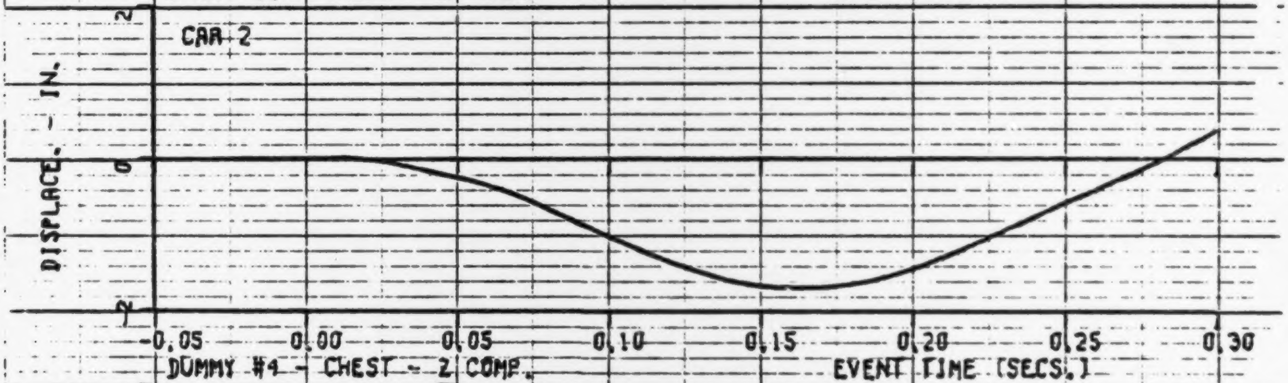

CAR 2
DISPLACE. - IN.
40
0
-40
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Y COMP.
EVENT TIME (SECS.)

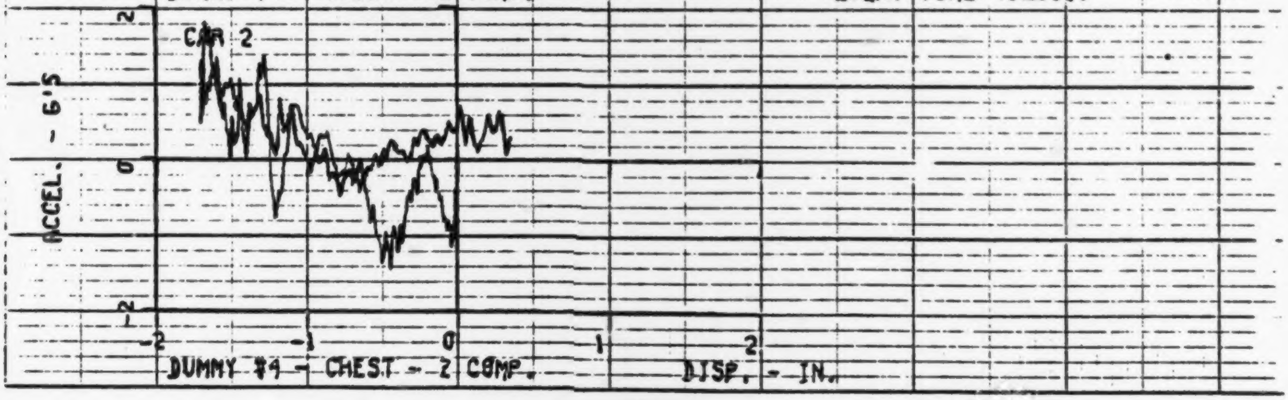

CAR 2
ACCEL. - G'S
10
0
-10
-10
0
10
20
30
DUMMY #4 - CHEST - Y COMP.
DISP. - IN.

6440-V-4


CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Z COMP.
EVENT TIME (SECS.)

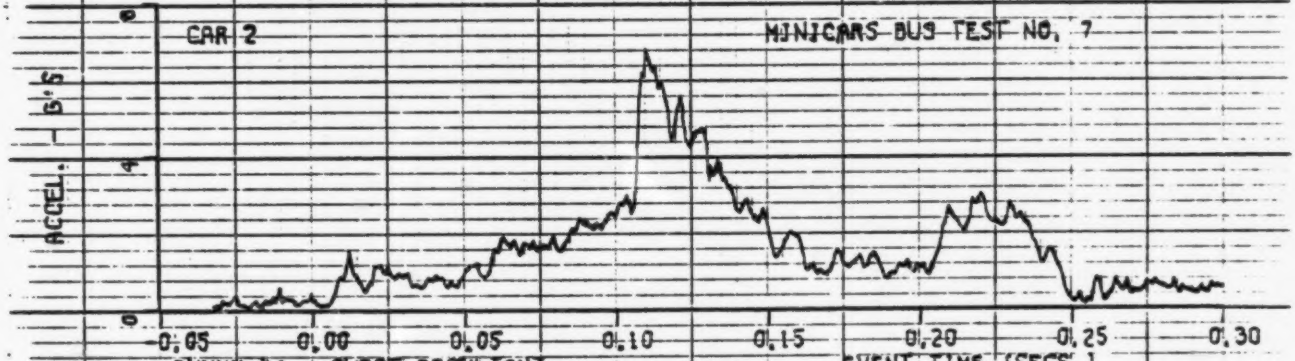

CAR 2
VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Z COMP.
EVENT TIME (SECS.)


CAR 2
DISPLACE. - IN.
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #4 - CHEST - Z COMP.
EVENT TIME (SECS.)

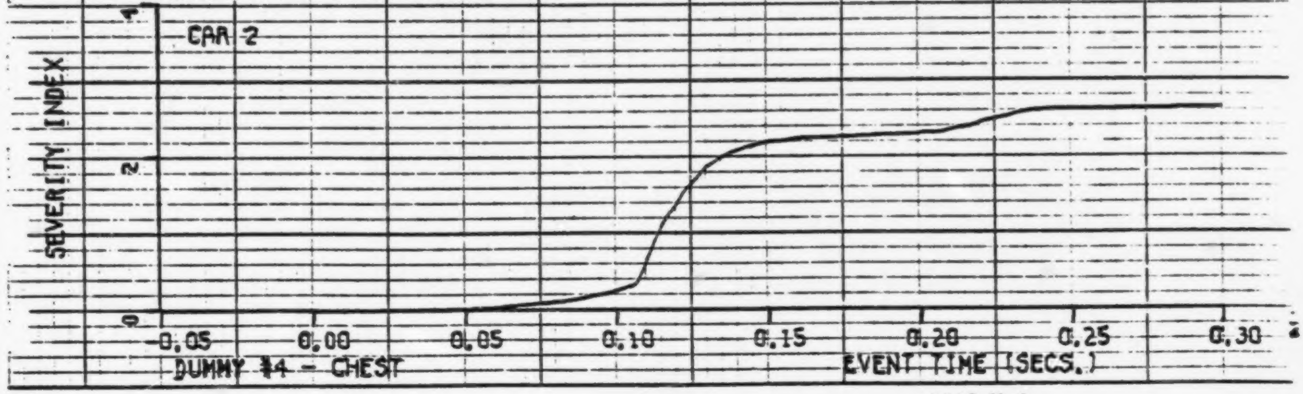

CAR 2
ACCEL. - G'S
2
0
-2
-2
-1
0
1
2
DUMMY #4 - CHEST - Z COMP.
DISP. - IN.

6140-V-4

546

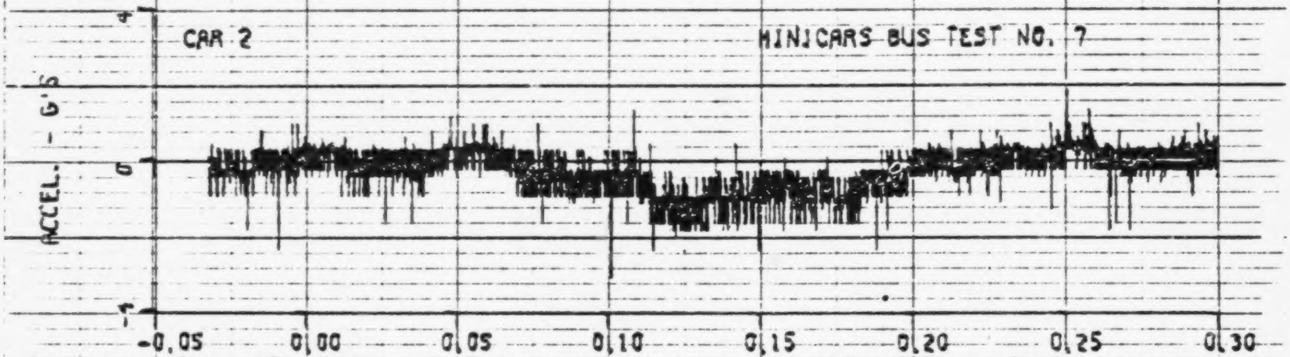


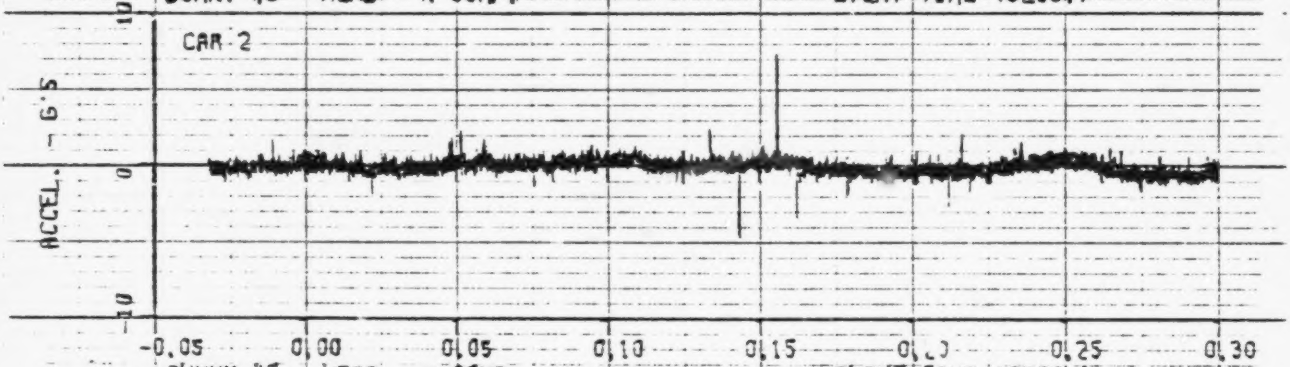
DUMMY #4 - CHEST RESULTANT

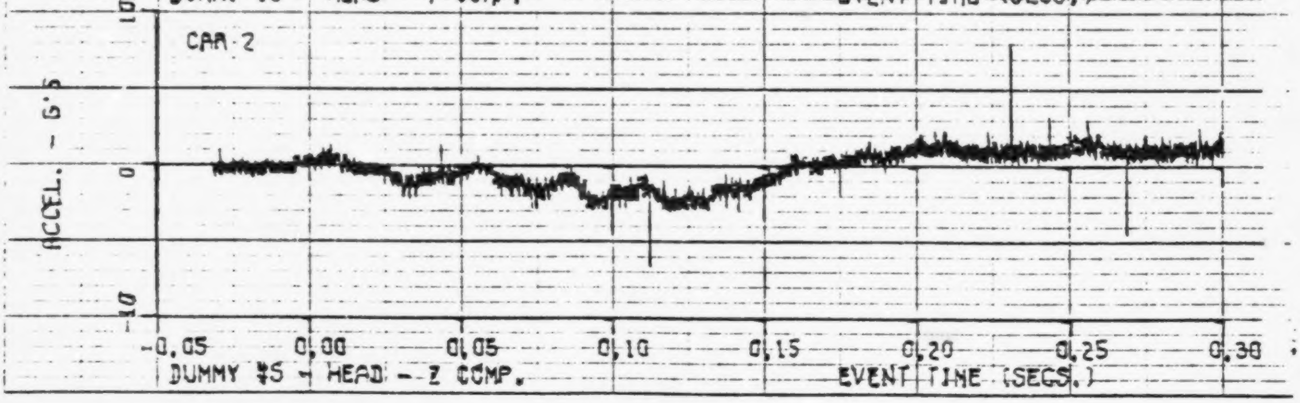


DUMMY #4 - CHEST

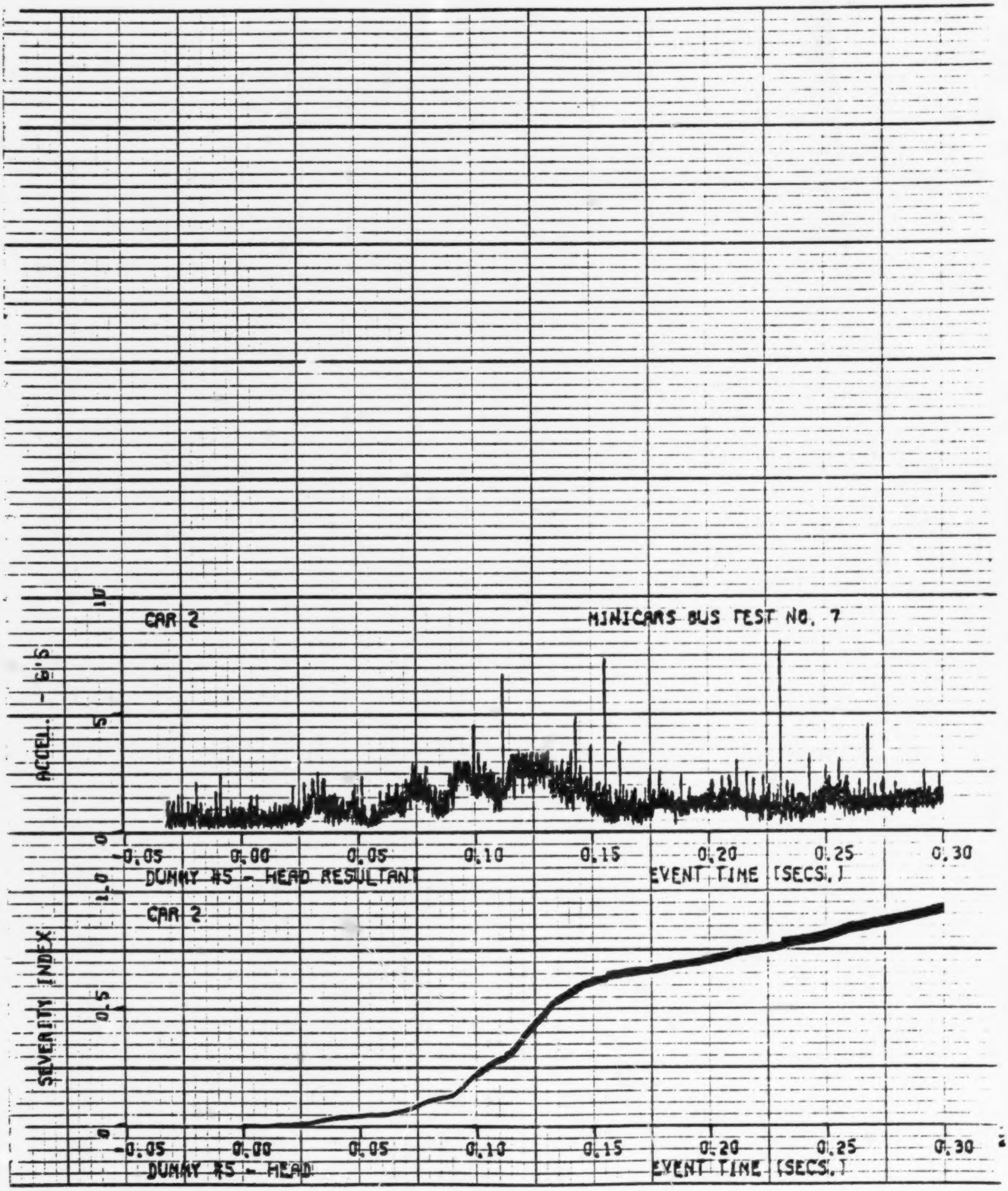
6440-V-4


CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - HEAD - X COMP.
EVENT TIME (SECS.)

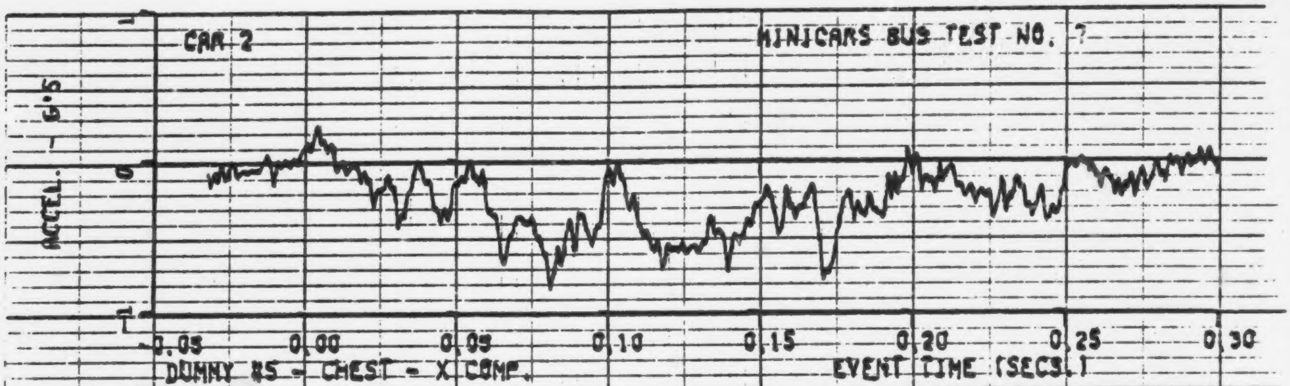

CAR 2
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - HEAD - Y COMP.
EVENT TIME (SECS.)

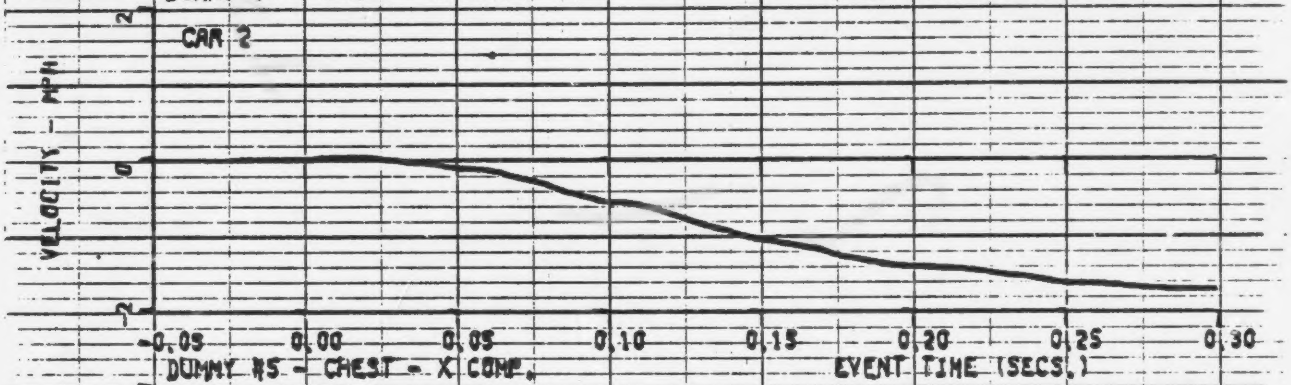

CAR 2
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - HEAD - Z COMP.
EVENT TIME (SECS.)

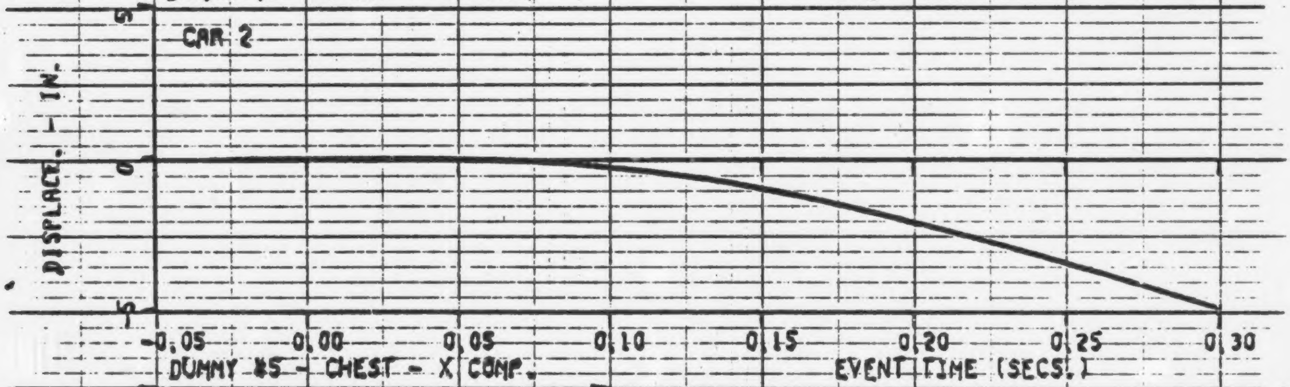
6440-V-4

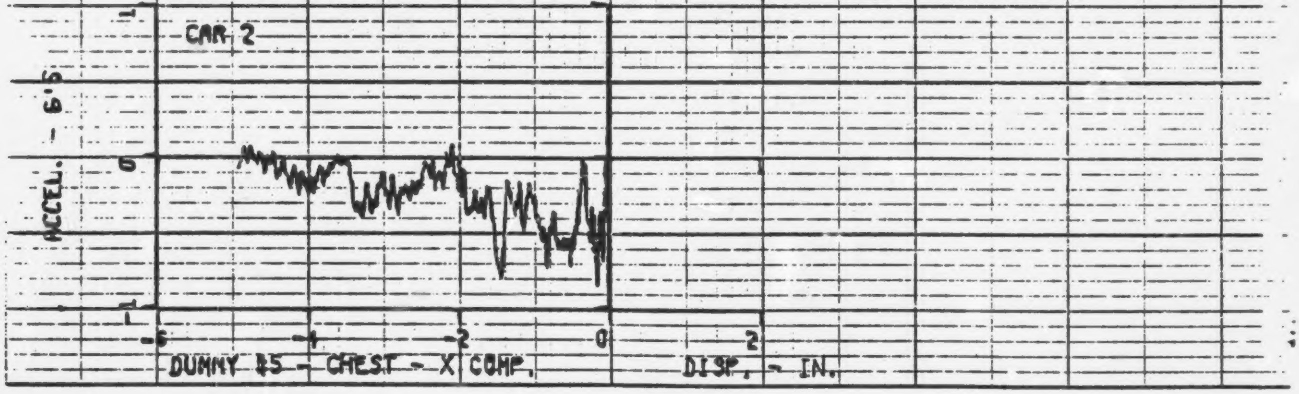

CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
10
5
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - HEAD RESULTANT
EVENT TIME (SECS.)
1.0
CAR 2
SEVERITY INDEX
0.5
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - HEAD
EVENT TIME (SECS.)

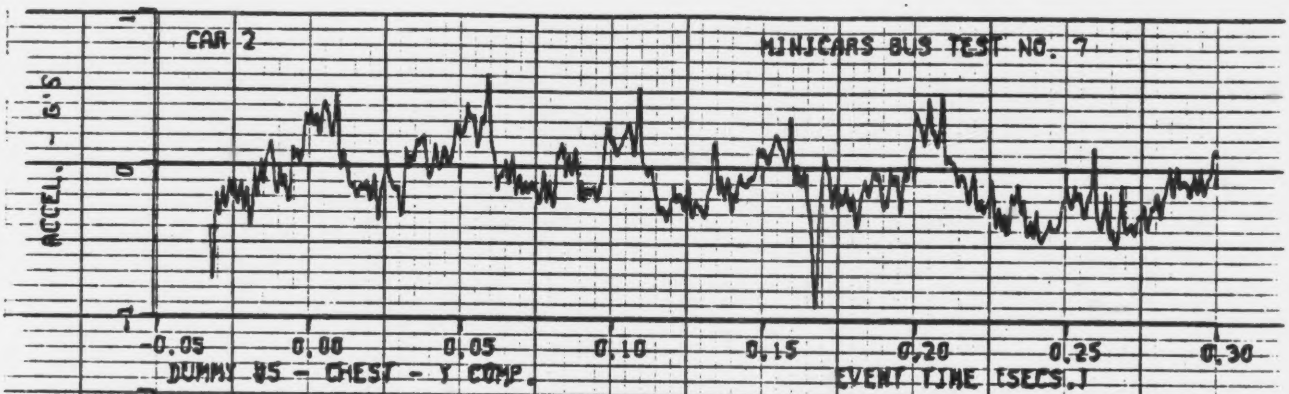
6440-V-4

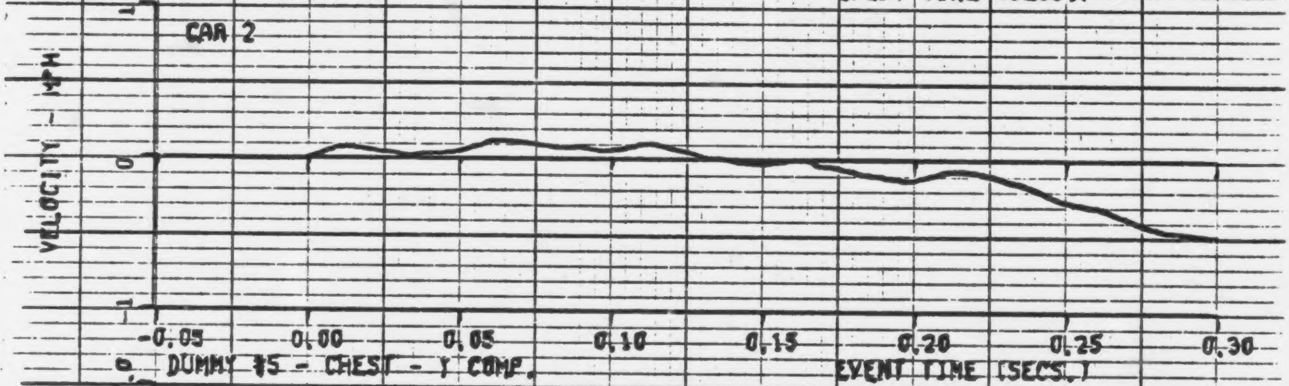

CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - X COMP.
EVENT TIME (SECS.)

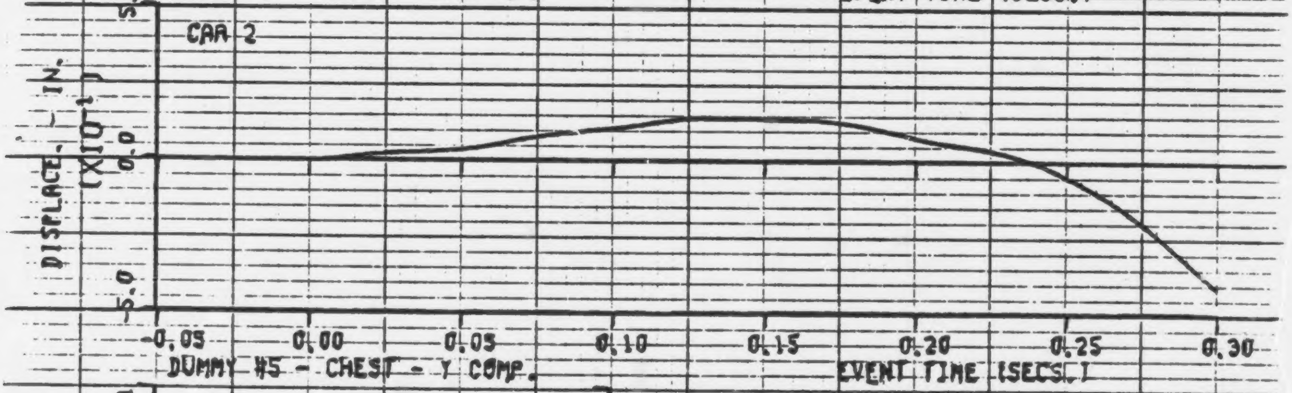

CAR 2
VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - X COMP.
EVENT TIME (SECS.)

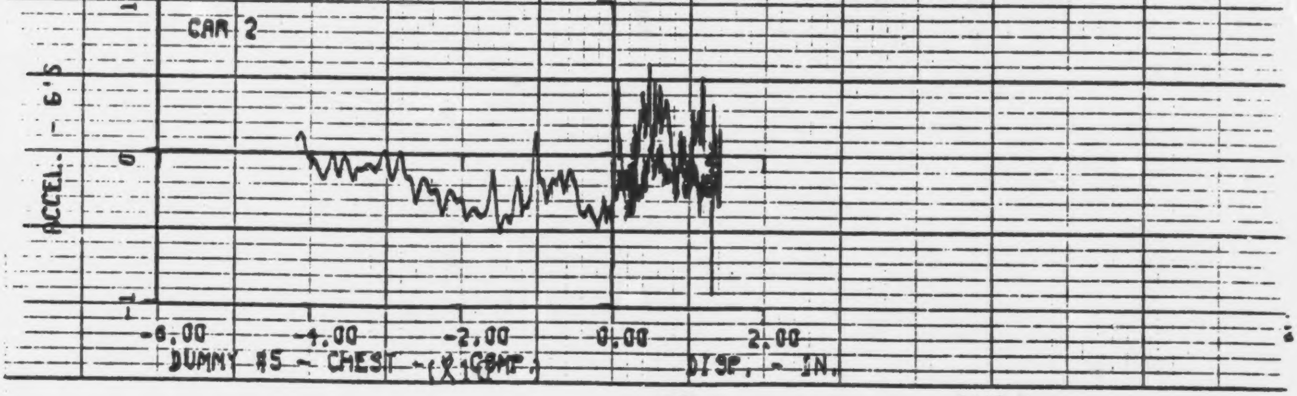

CAR 2
DISPLACE. - IN.
5
0
-5
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - X COMP.
EVENT TIME (SECS.)


CAR 2
ACCEL. - G'S
1
0
-1
-6
-4
-2
0
2
DUMMY #5 - CHEST - X COMP.
DISP. - IN.


CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Y COMP.
EVENT TIME [SECS.]

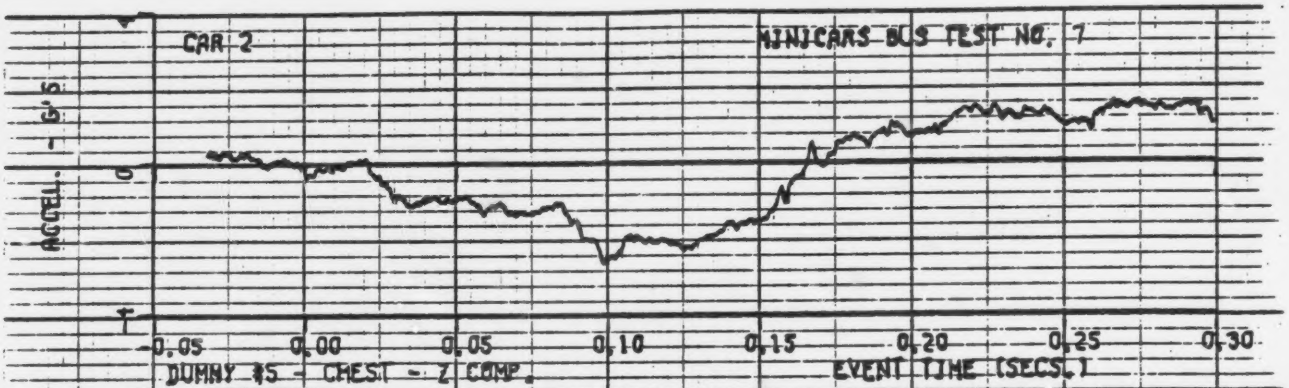

CAR 2
VELOCITY - MPH
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Y COMP.
EVENT TIME [SECS.]

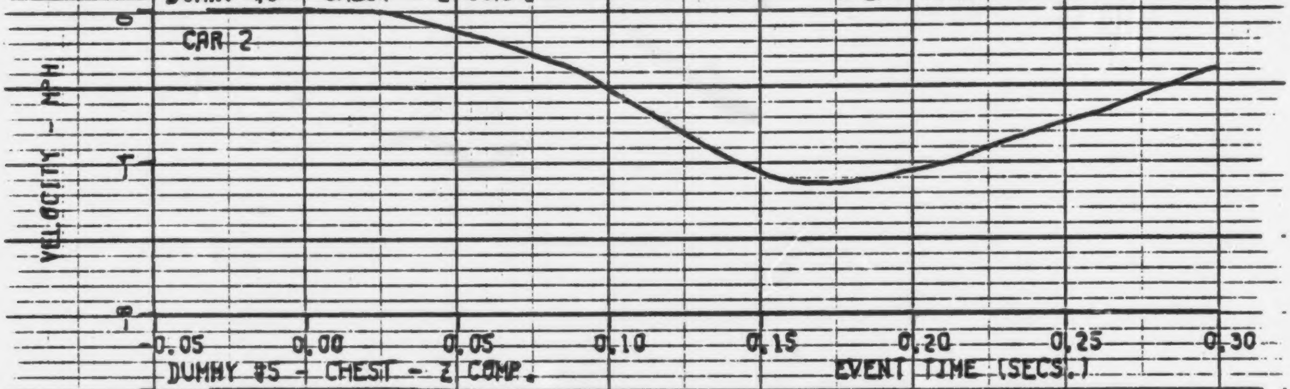

CAR 2
DISPLACE. - IN.
[X10⁻¹]
5.0
0.0
-5.0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Y COMP.
EVENT TIME [SECS.]

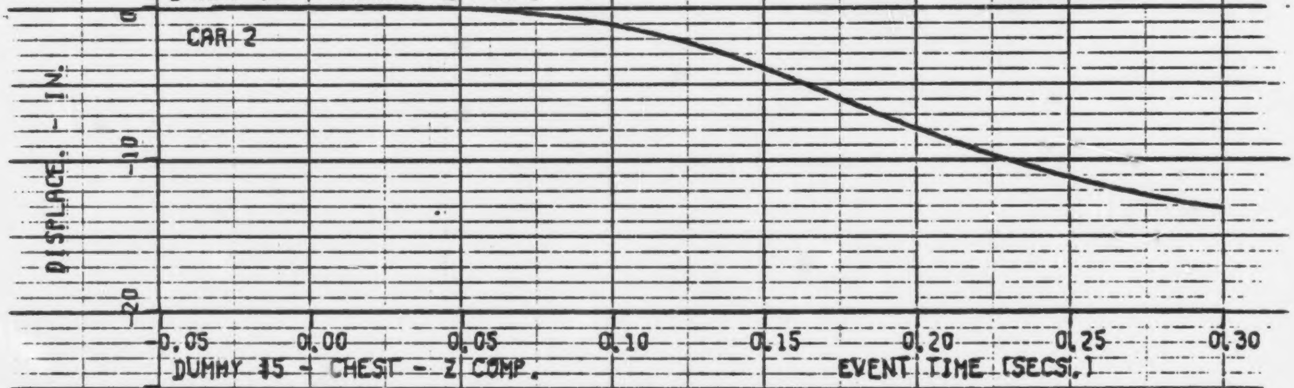

CAR 2
ACCEL. - G'S
1
0
-1
-6.00
-4.00
-2.00
0.00
2.00
DUMMY #5 - CHEST - Y COMP.
[X10⁻¹]
DISP. - IN.

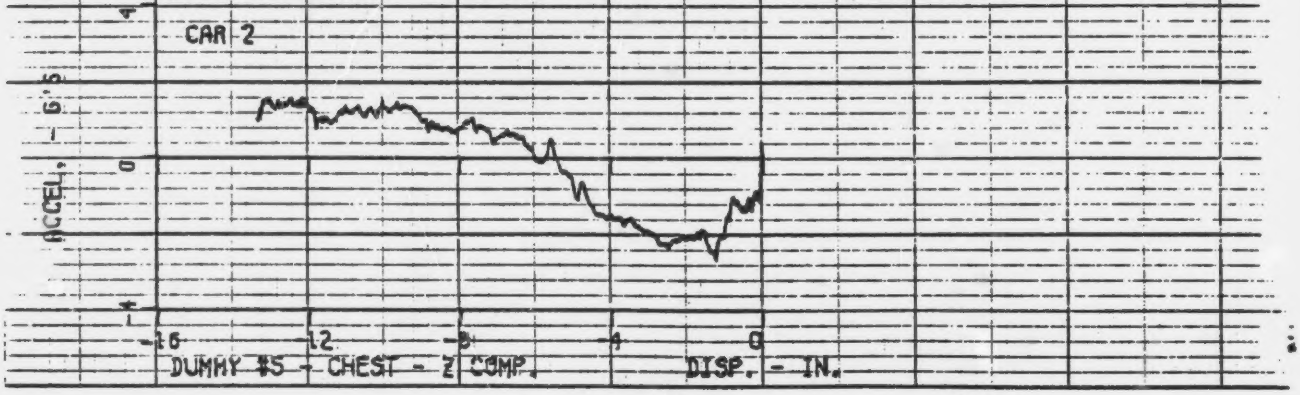
6440-V-4

551

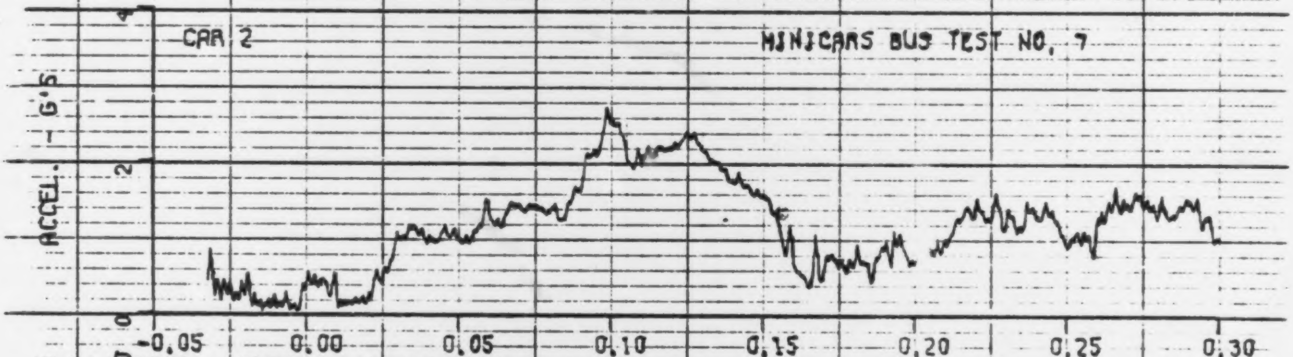

CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Z COMP.
EVENT TIME (SECS.)


CAR 2
VELOCITY - MPH
0
-4
-8
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Z COMP.
EVENT TIME (SECS.)


CAR 2
DISPLACE. - IN.
0
-10
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - CHEST - Z COMP.
EVENT TIME (SECS.)

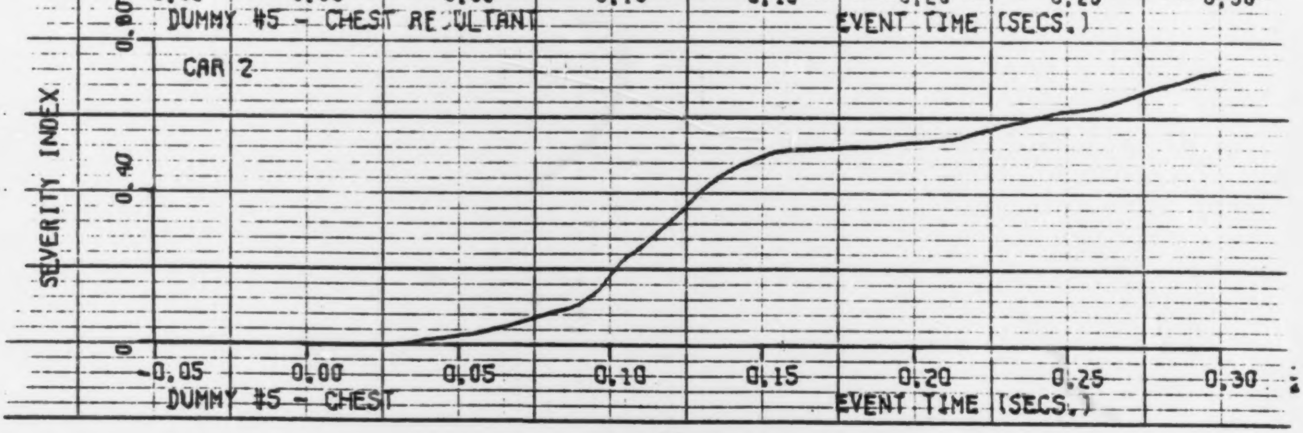

CAR 2
ACCEL. - G'S
4
0
-4
-16
-12
-8
-4
0
DUMMY #5 - CHEST - Z COMP.
DISP. - IN.

6440-V-4



DUMMY #5 - CHEST RESULTANT

EVENT TIME (SECS.)

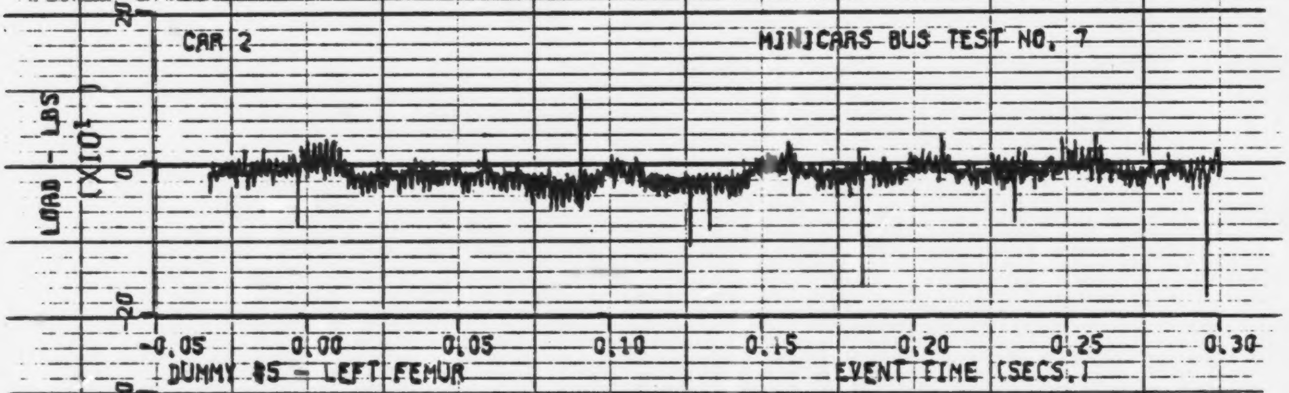


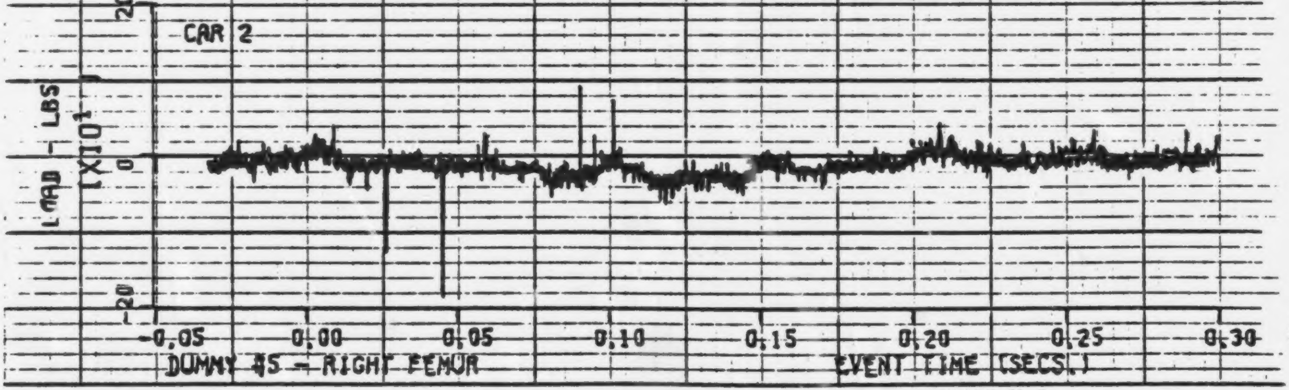
DUMMY #5 - CHEST

EVENT TIME (SECS.)

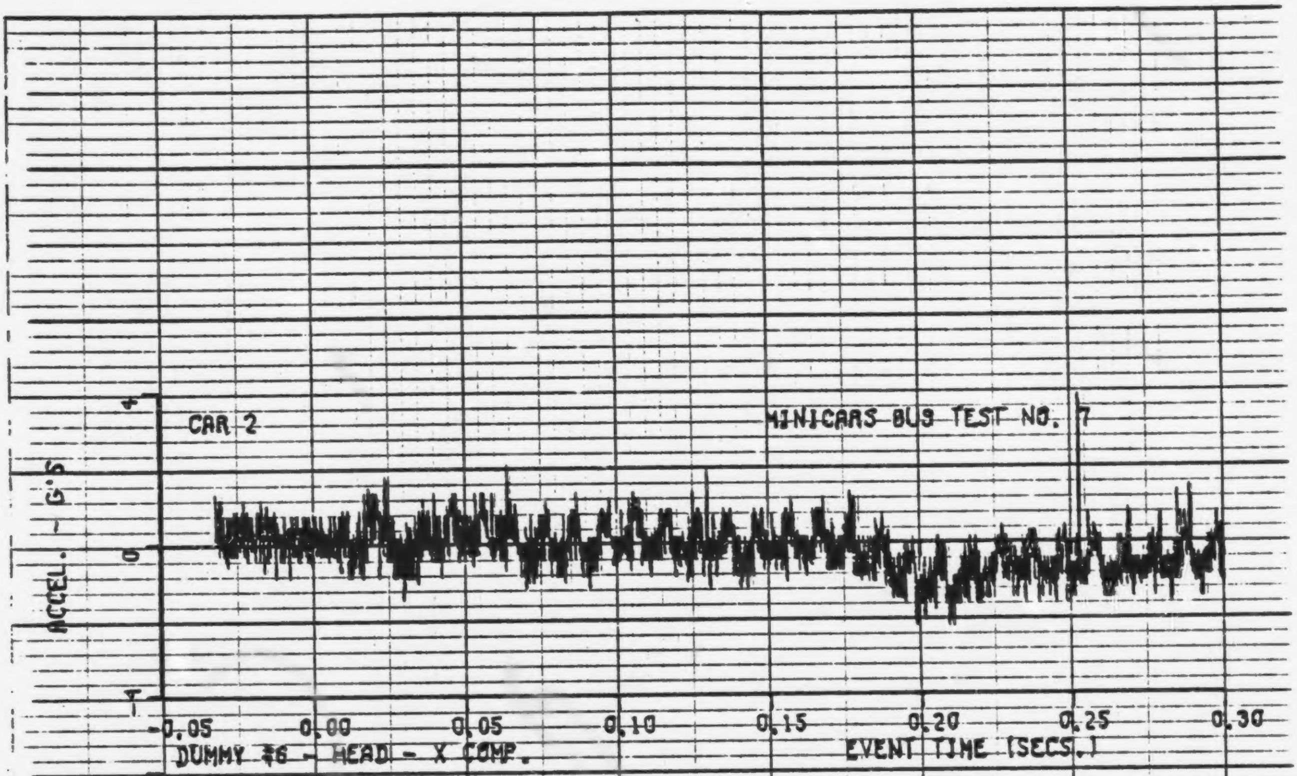
553

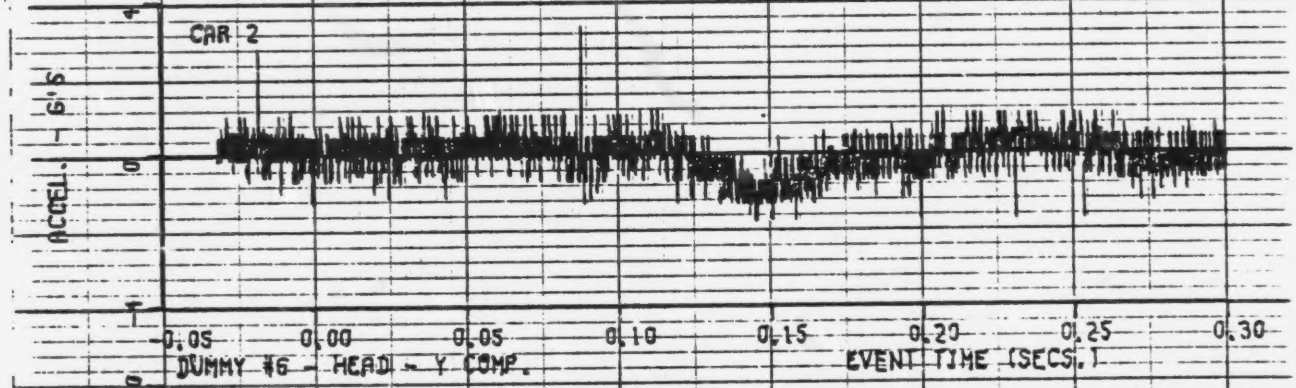
6440-V-4

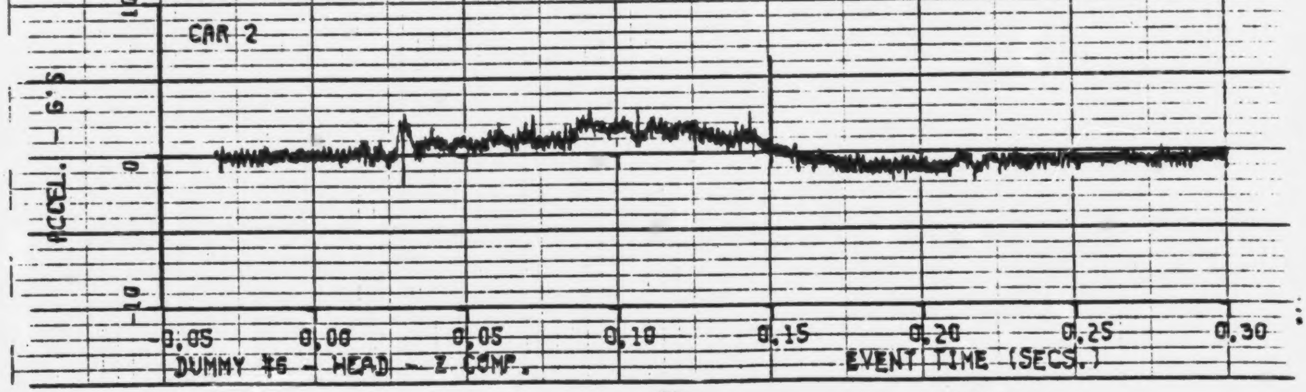

20
CAR 2
MINICARS BUS TEST NO. 7
LOAD - LBS
(X10¹)
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - LEFT FEMUR
EVENT TIME (SECS.)

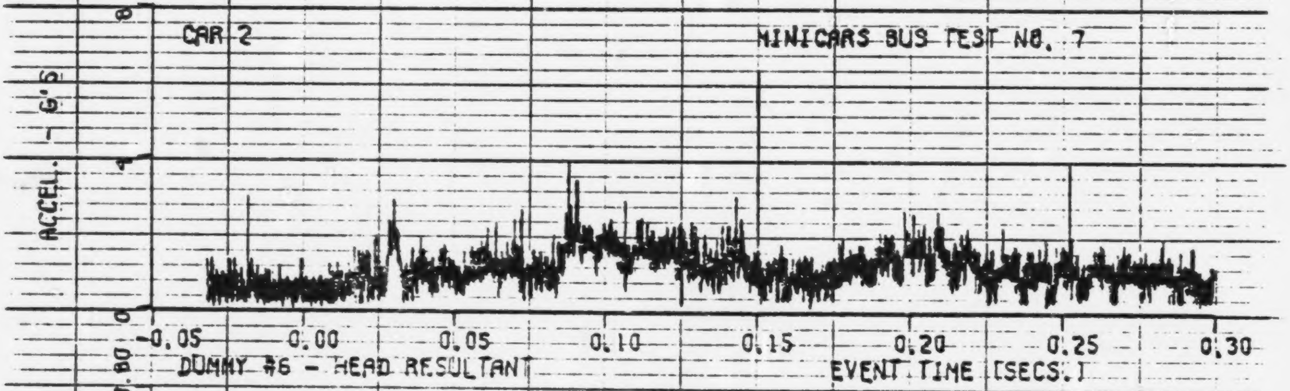

20
CAR 2
LOAD - LBS
(X10¹)
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #5 - RIGHT FEMUR
EVENT TIME (SECS.)

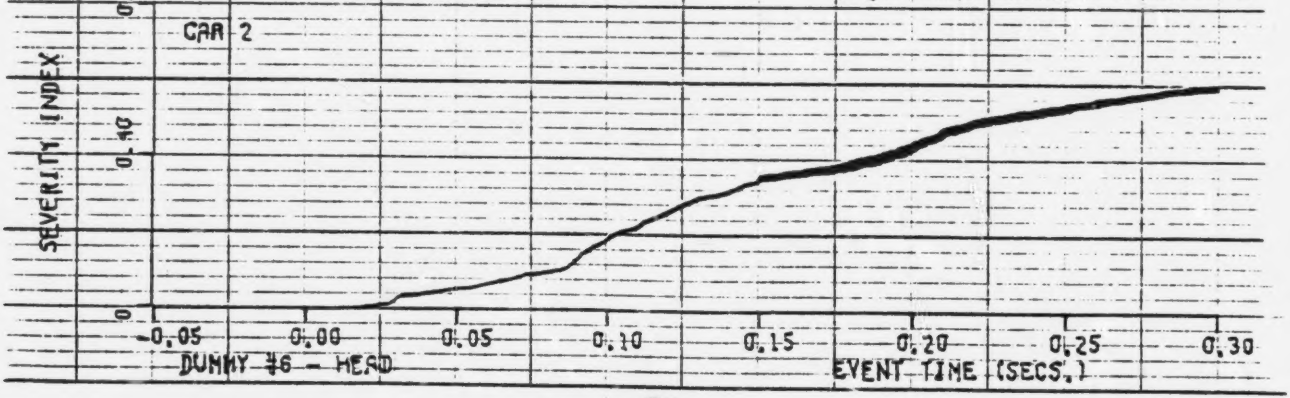
6440-V-4


CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD - X COMP.
EVENT TIME (SECS.)

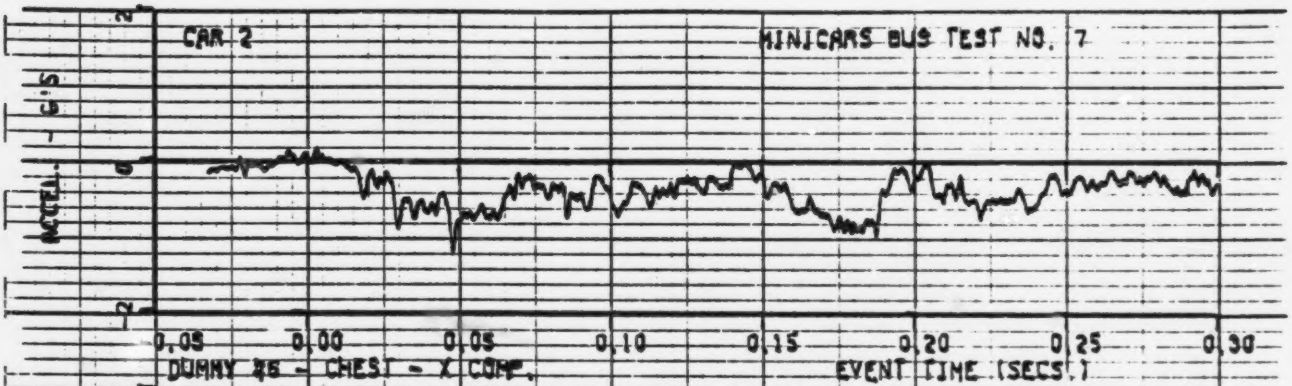

CAR 2
ACCEL. - G'S
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD - Y COMP.
EVENT TIME (SECS.)

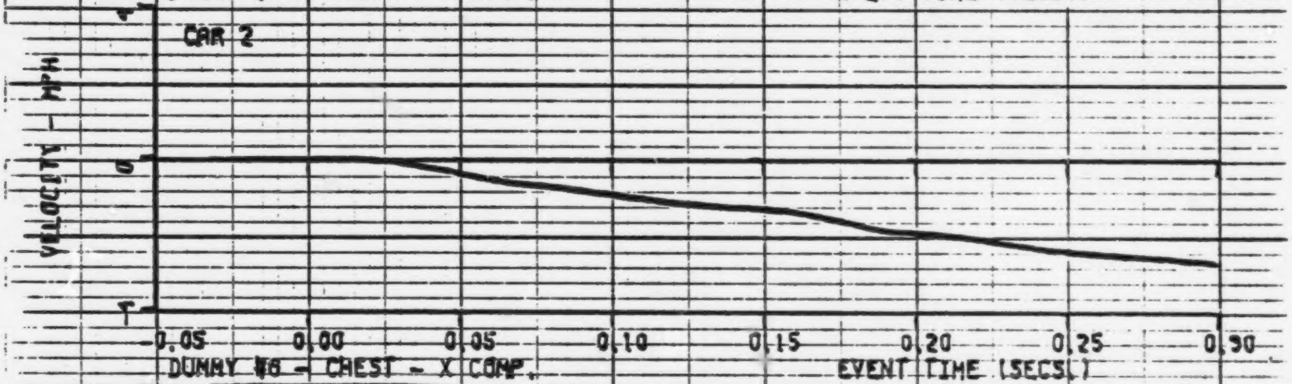

CAR 2
ACCEL. - G'S
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD - Z COMP.
EVENT TIME (SECS.)

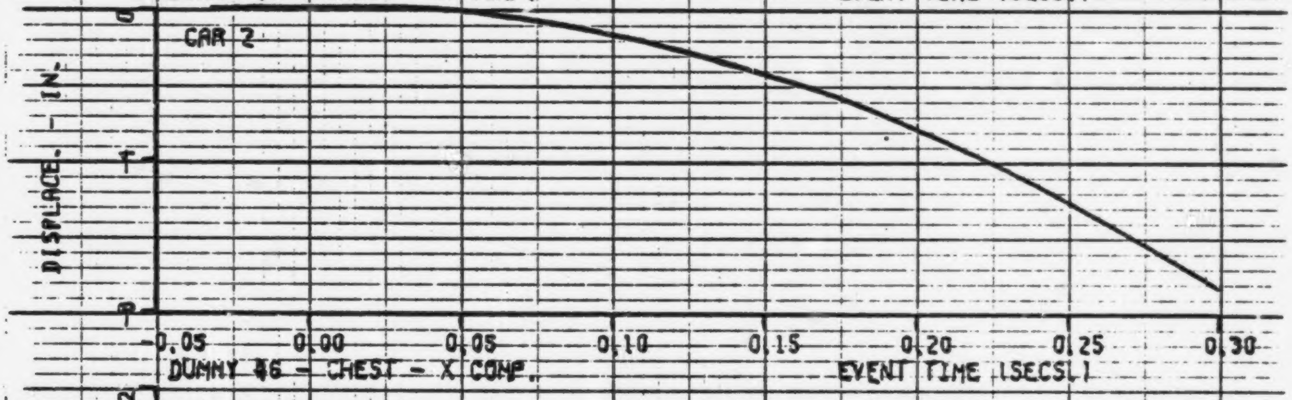

CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
8
4
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD RESULTANT
EVENT TIME (SECS.)

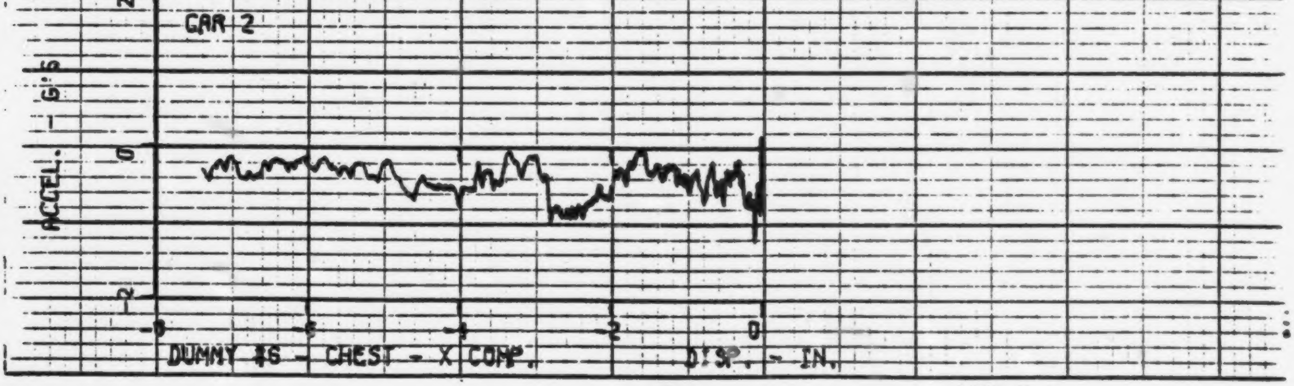

0.80
CAR 2
SEVERITY INDEX
0.40
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - HEAD
EVENT TIME (SECS.)

6440-V-4

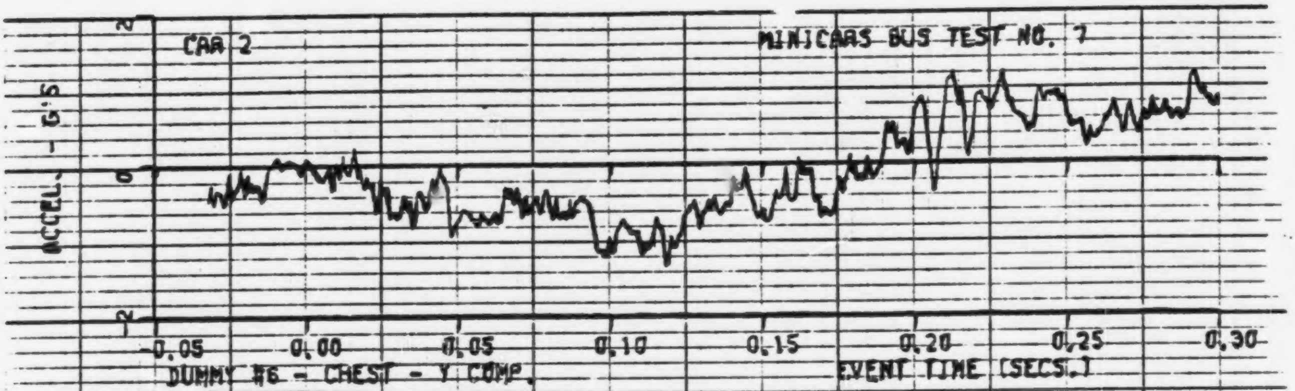

CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - X COMP.
EVENT TIME (SECS.)

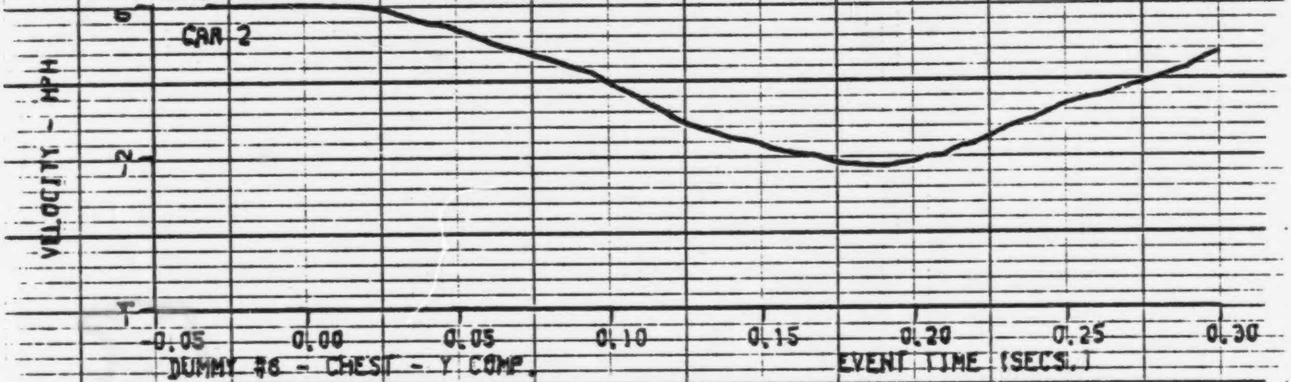

CAR 2
VELOCITY - MPH
1
0
-1
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - X COMP.
EVENT TIME (SECS.)

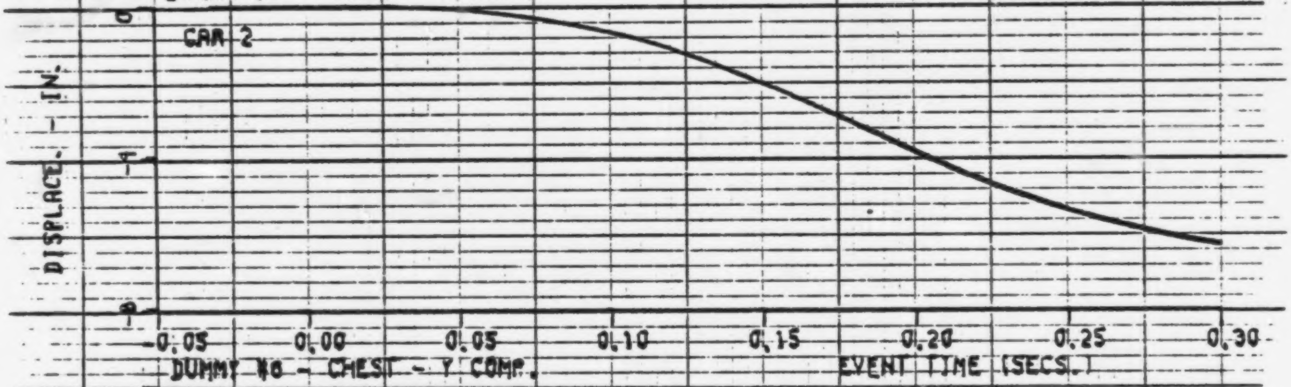

CAR 2
DISPLACE. - IN.
0
-1
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - X COMP.
EVENT TIME (SECS.)

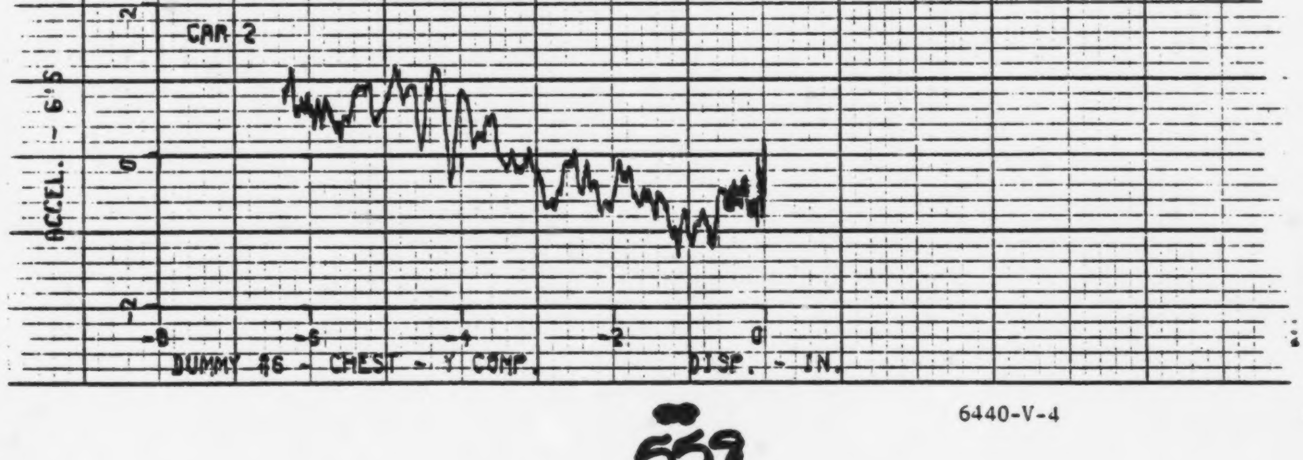

CAR 2
ACCEL. - G'S
2
0
-2
-8
-6
-4
-2
0
DUMMY #6 - CHEST - X COMP.
DISP. - IN.

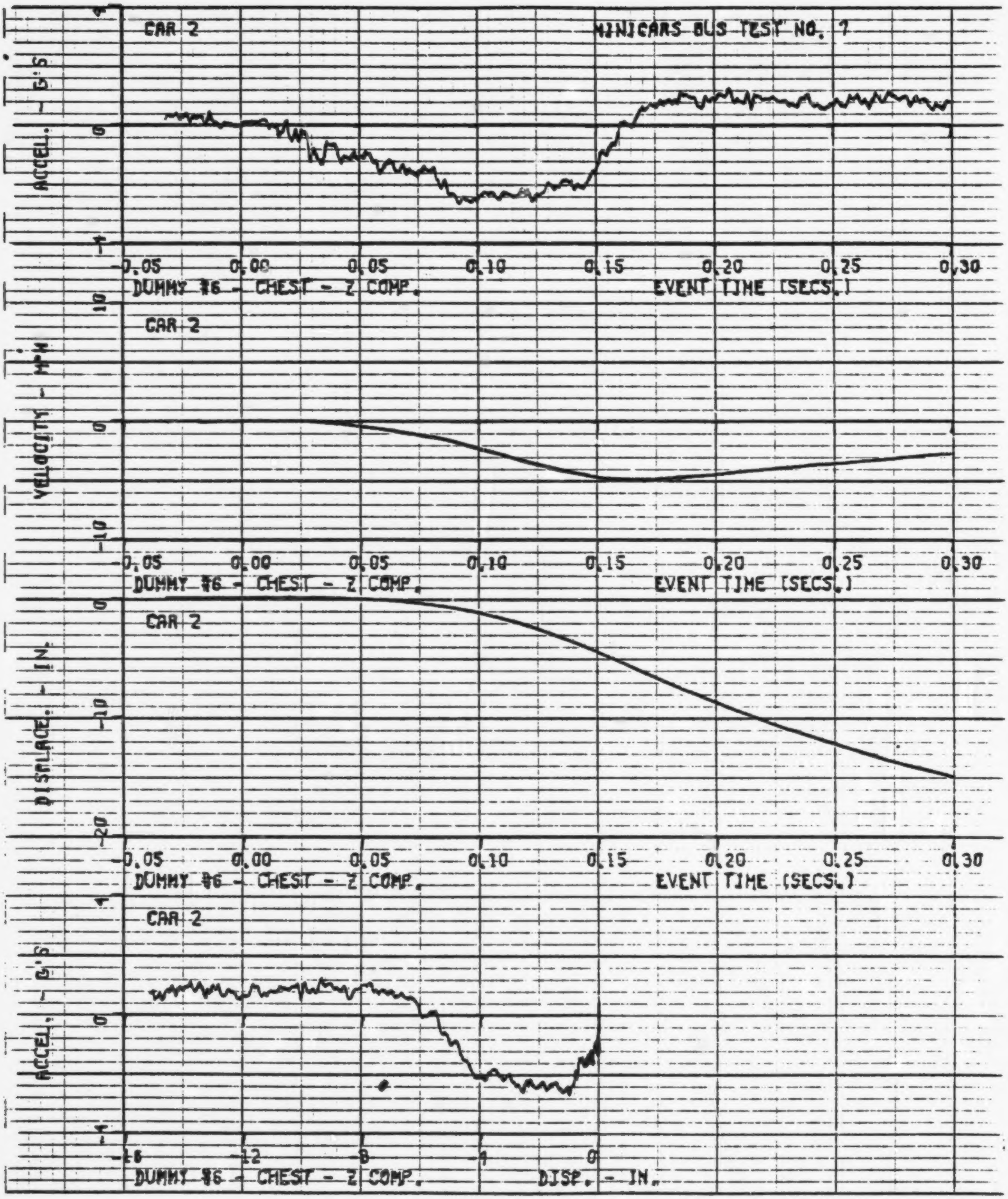
6440-V-4

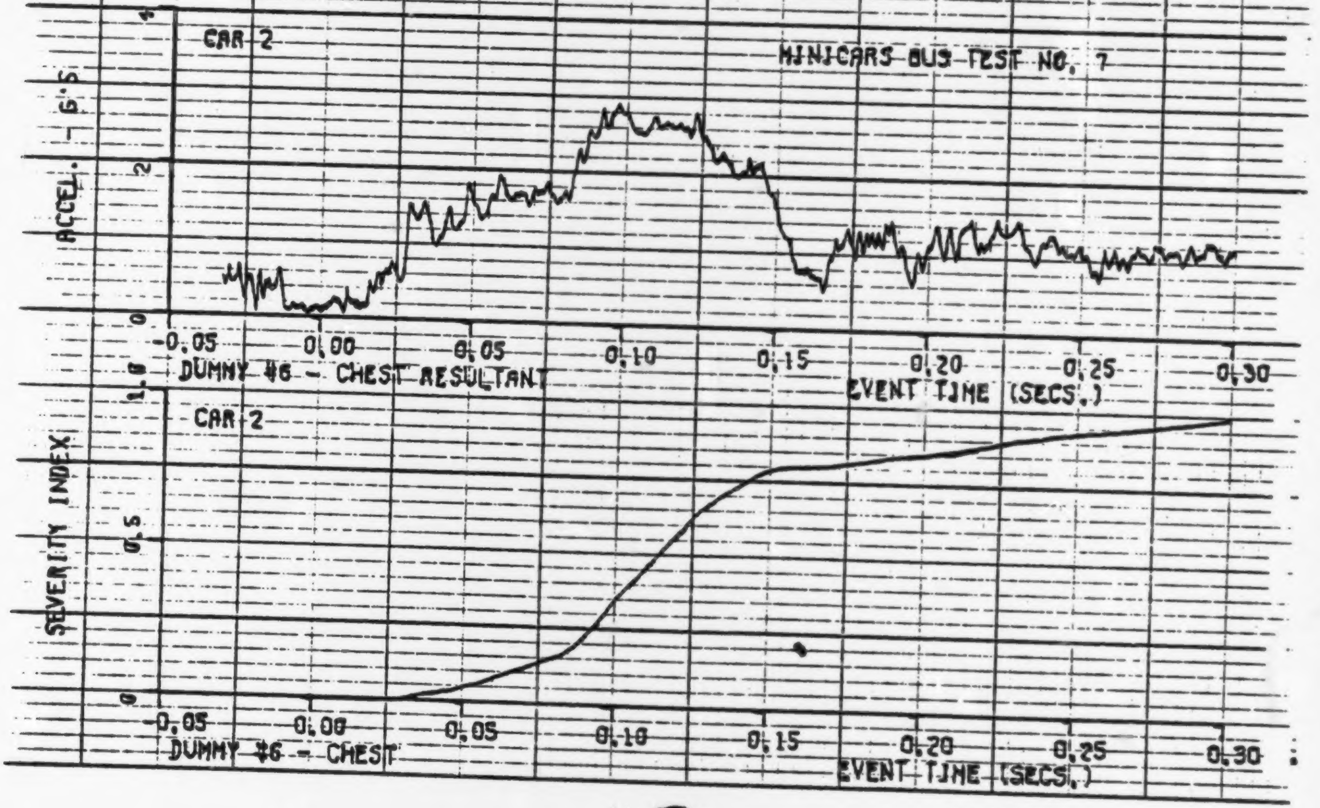

CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Y COMP.
EVENT TIME (SECS.)


CAR 2
VELOCITY - MPH
0
-2
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Y COMP.
EVENT TIME (SECS.)


CAR 2
DISPLACE. - IN.
0
-4
-8
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Y COMP.
EVENT TIME (SECS.)

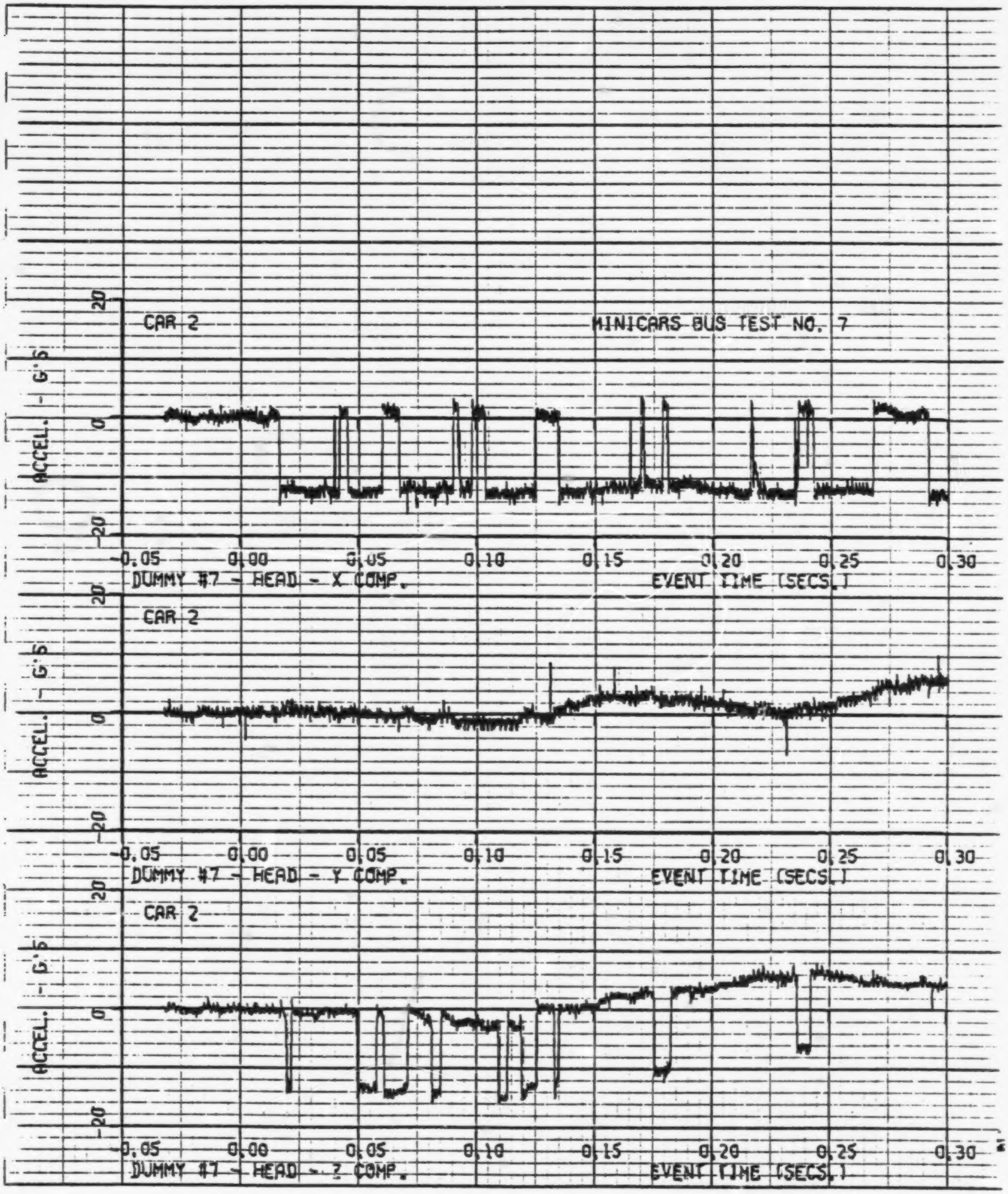

CAR 2
ACCEL. - G'S
2
0
-2
-8
-6
-4
-2
0
DUMMY #6 - CHEST - Y COMP.
DISP. - IN.


CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Z COMP.
EVENT TIME (SECS.)
CAR 2
VELOCITY - MPH
10
0
-10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Z COMP.
EVENT TIME (SECS.)
CAR 2
DISPLACE. - IN.
0
-10
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST - Z COMP.
EVENT TIME (SECS.)
CAR 2
ACCEL. - G'S
4
0
-4
-16
-12
-8
-4
0
DUMMY #6 - CHEST - Z COMP.
DISP. - IN.


CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
0
2
4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST RESULTANT
EVENT TIME (SECS.)
CAR 2
SEVERITY INDEX
0
0.5
1.0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #6 - CHEST
EVENT TIME (SECS.)

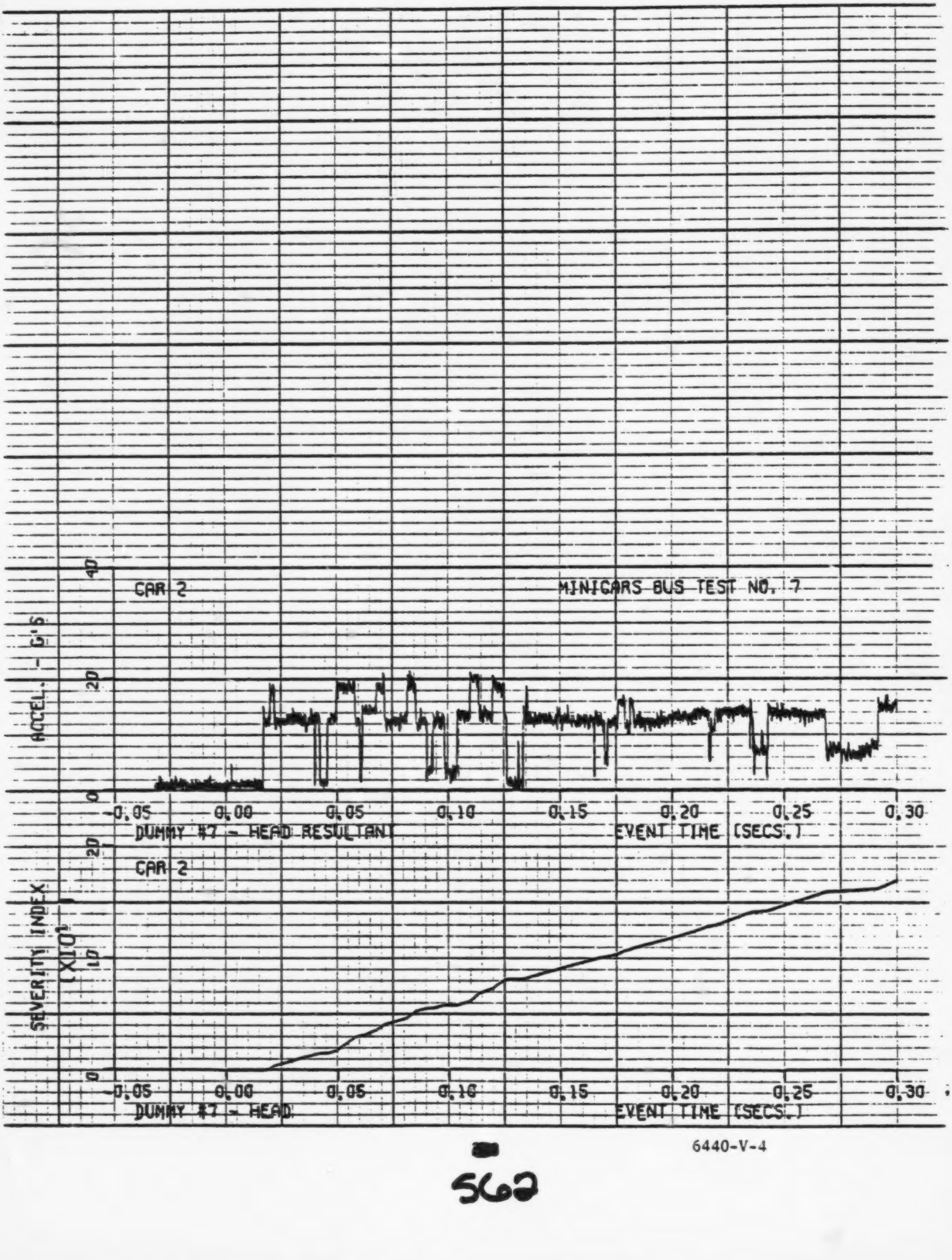
6440-V-4

560


MINICARS BUS TEST NO. 7
CAR 2
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - HEAD - X COMP.
EVENT TIME (SECS.)
CAR 2
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - HEAD - Y COMP.
EVENT TIME (SECS.)
CAR 2
ACCEL. - G'S
20
0
-20
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - HEAD - Z COMP.
EVENT TIME (SECS.)

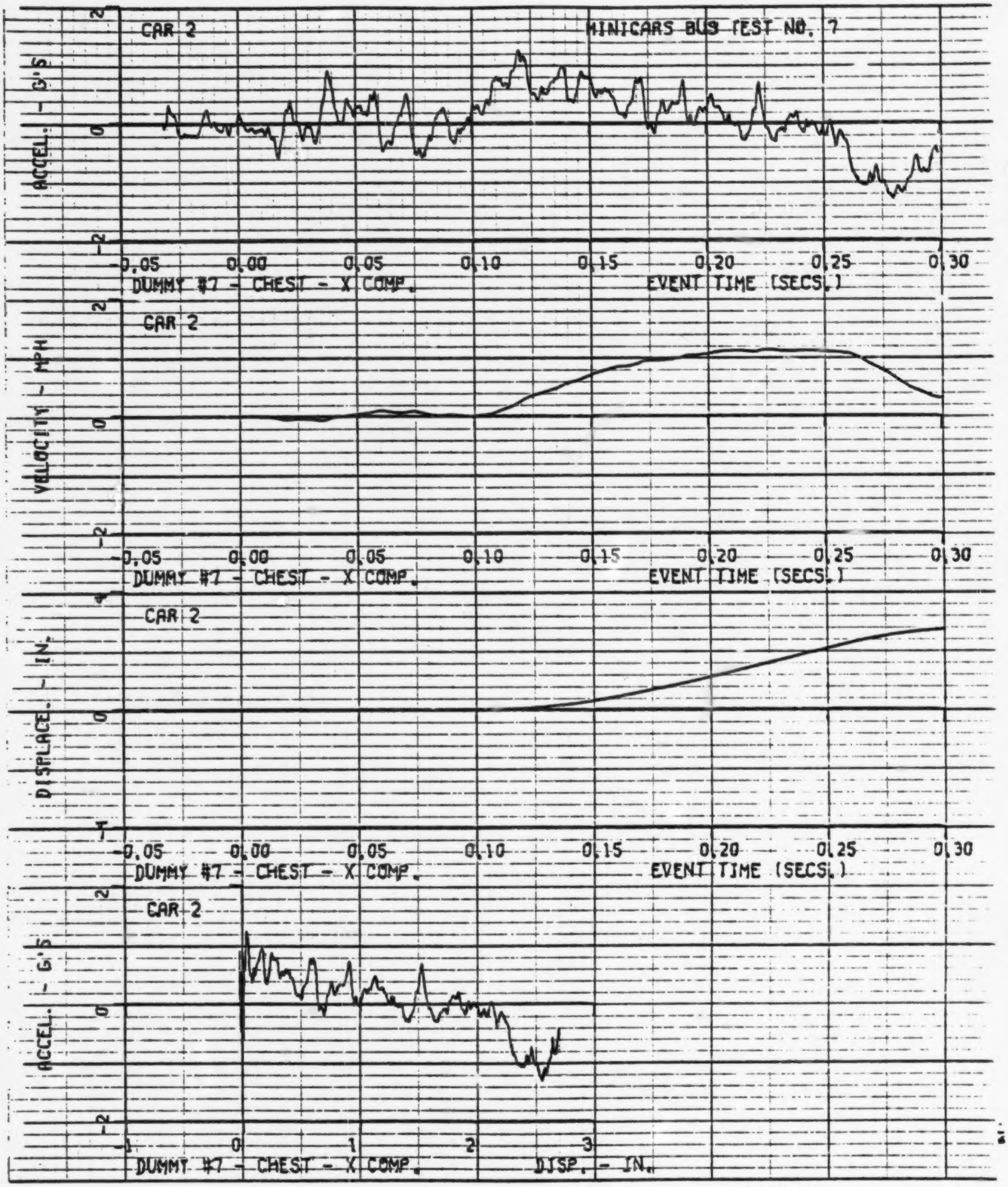
644C-V-4

561

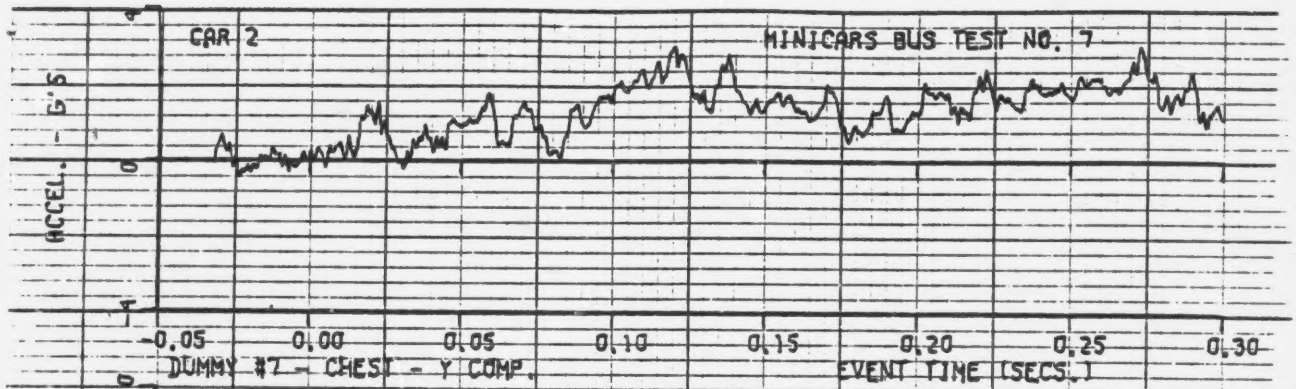

CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - HEAD RESULTANT
EVENT TIME (SECS.)
CAR 2
SEVERITY INDEX (X10¹)
20
10
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - HEAD
EVENT TIME (SECS.)

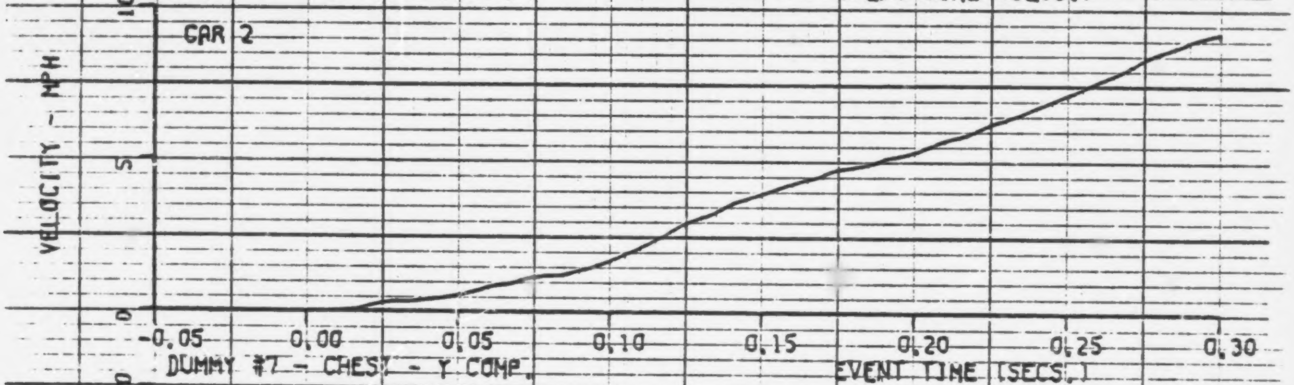
6440-V-4

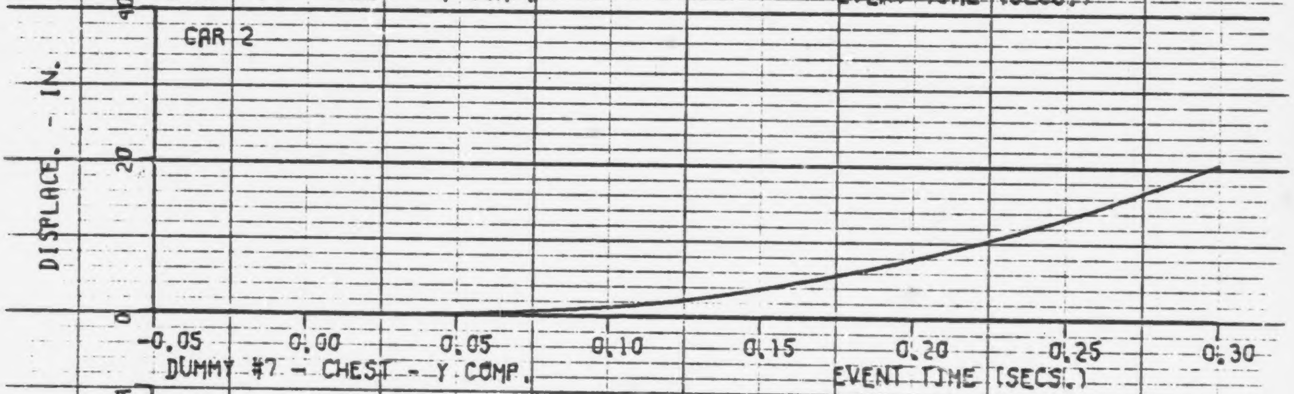
562

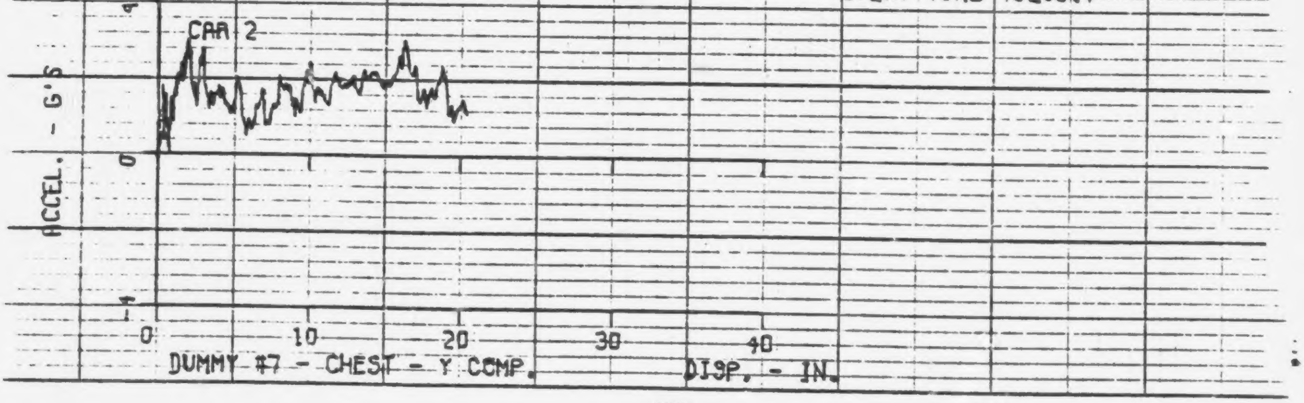

MINICARS BUS TEST NO. 7
CAR 2
ACCEL. - G'S
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST - X COMP.
EVENT TIME (SECS.)
CAR 2
VELOCITY - MPH
2
0
-2
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST - X COMP.
EVENT TIME (SECS.)
CAR 2
DISPLACE. - IN.
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST - X COMP.
EVENT TIME (SECS.)
CAR 2
ACCEL. - G'S
2
0
-2
-1
0
1
2
3
DUMMY #7 - CHEST - X COMP.
DISP. - IN.

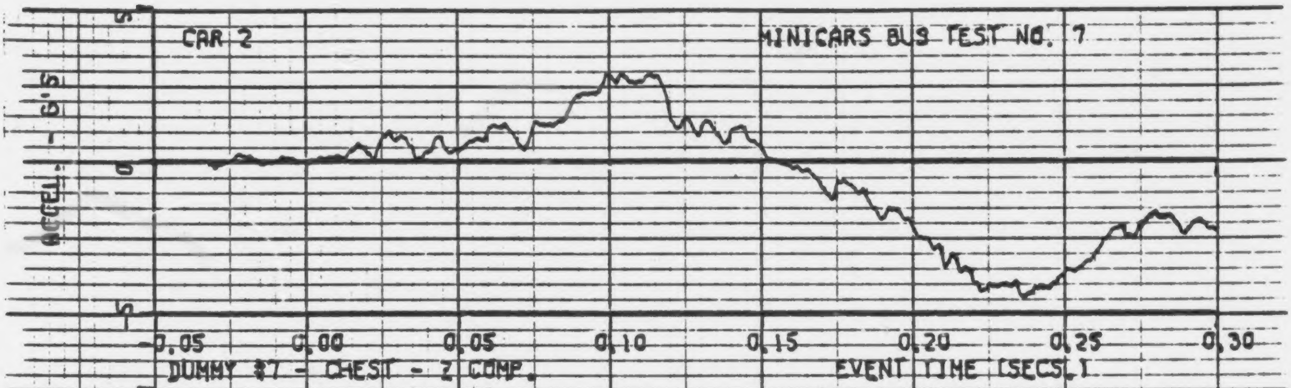
6440-V-4


CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
4
0
-4
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST - Y COMP.
EVENT TIME (SECS.)

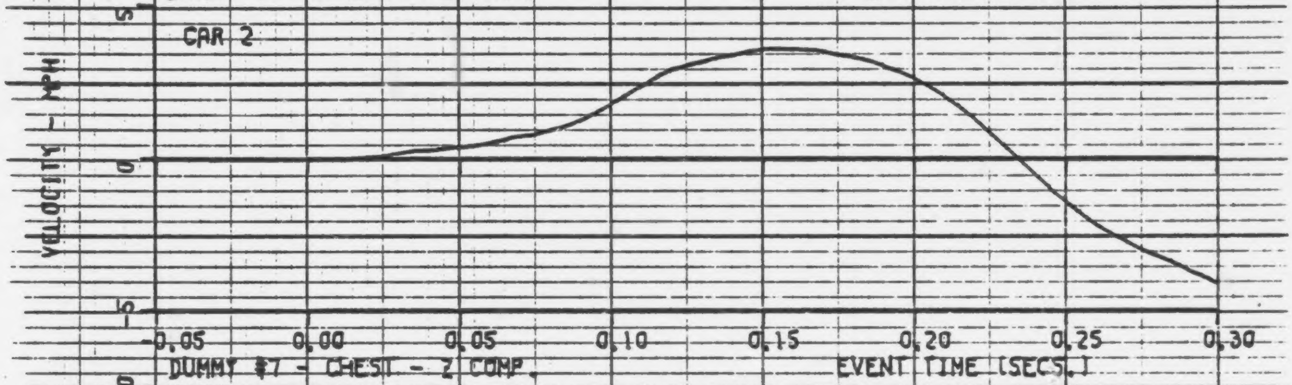

CAR 2
VELOCITY - MPH
10
5
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST - Y COMP.
EVENT TIME (SECS.)


CAR 2
DISPLACE. - IN.
40
20
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST - Y COMP.
EVENT TIME (SECS.)

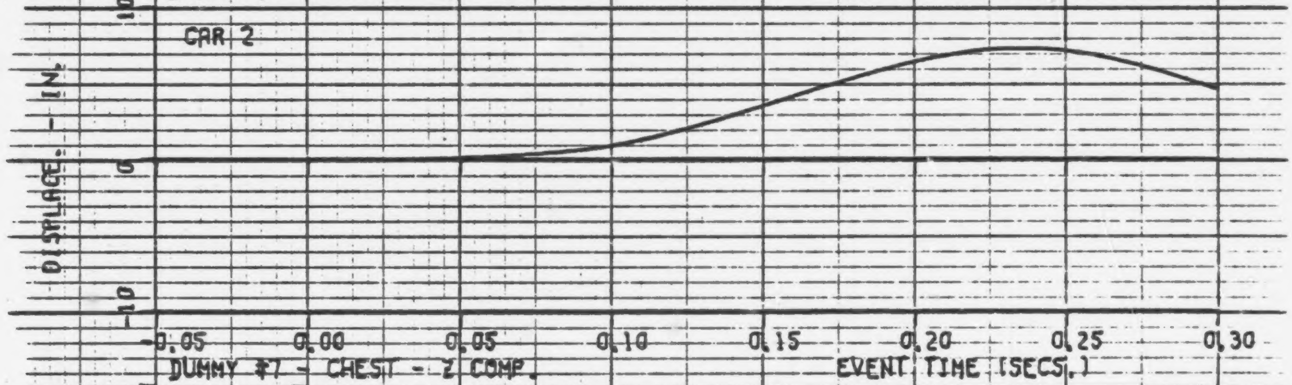

CAR 2
ACCEL. - G'S
4
0
-4
0
10
20
30
40
DUMMY #7 - CHEST - Y COMP.
DISP. - IN.



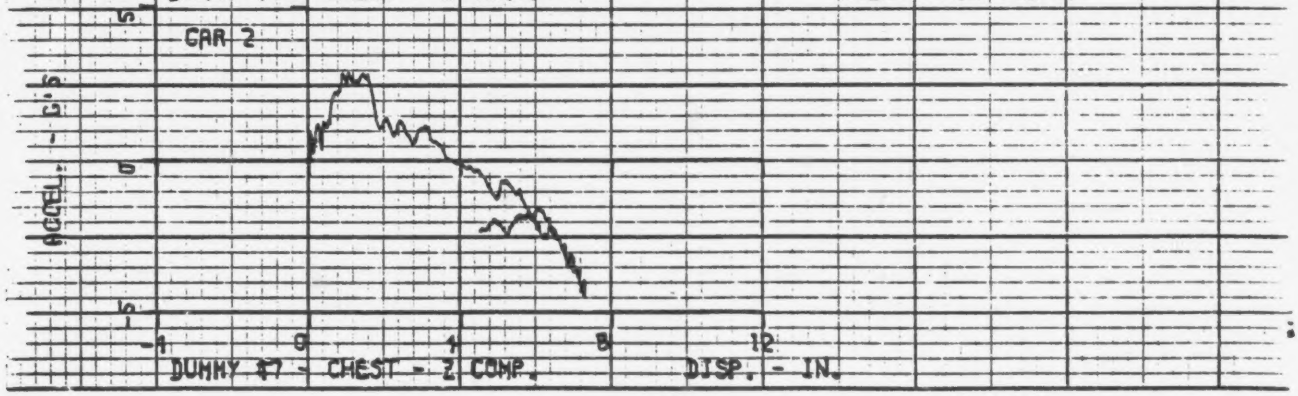
DUMMY #7 - CHEST - Z COMP.



DUMMY #7 - CHEST - Z COMP.

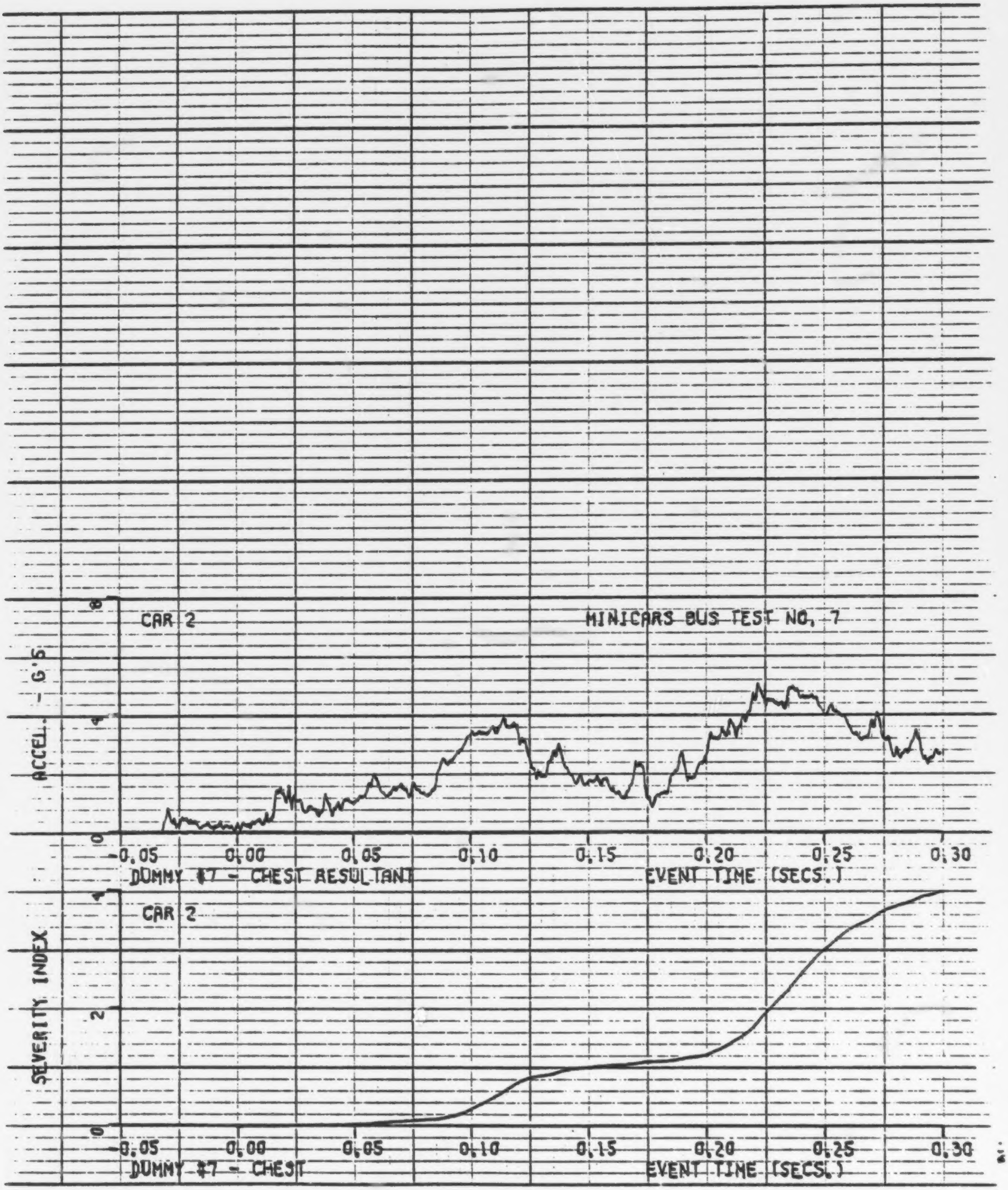


DUMMY #7 - CHEST - Z COMP.



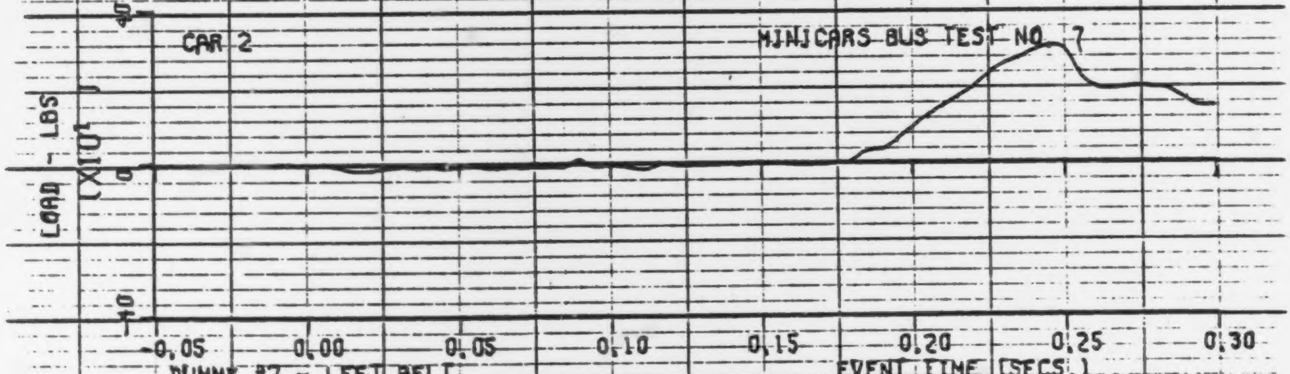
DUMMY #7 - CHEST - Z COMP.

6440-V-4

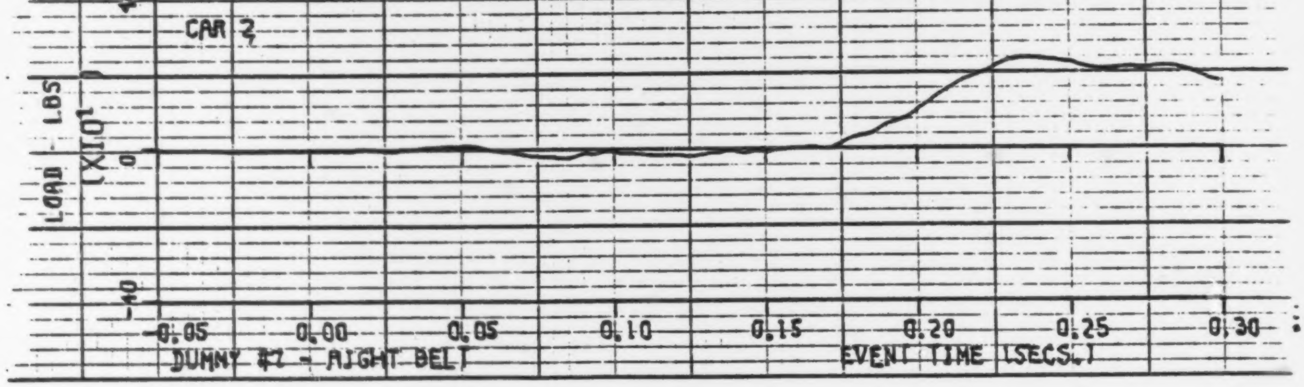

CAR 2
MINICARS BUS TEST NO. 7
ACCEL. - G'S
8
4
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST RESULTANT
EVENT TIME (SECS.)
CAR 2
SEVERITY INDEX
4
2
0
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30
DUMMY #7 - CHEST
EVENT TIME (SECS.)

6440-V-4

566



DUMMY #7 - LEFT BELT



DUMMY #7 - RIGHT BELT

6440-V-4

567

BLANK PAGE

CALSPAN ADVANCED TECHNOLOGY CENTER

BUS CRASH TEST PROGRAM
TEST NO. 8

Donald A. Alianello

Calspan Report No. 6440-V-5

Prepared for:

MINICARS, INC.
55 DEPOT ROAD
GOLETA, CALIFORNIA 93017

PURCHASE ORDER NO. 5458
IN SUPPORT OF: NHTSA CONTRACT NO. DOT-HS-7-01774

TEST: TEST NO. 8 (FLXIBLE TRANSIT BUS)

TYPE OF TEST: FRONTAL FIXED BARRIER

TEST DATE: MAY 24, 1979

A DIVISION OF CALSPAN CORPORATION
AN ARVIN COMPANY   PO BOX 400   BUFFALO NEW YORK 14225

569

TABLE OF CONTENTS

Page No.

LIST OF FIGURES iii

LIST OF TABLES iv

PRESENTATION OF RESULTS 1

TEST OBJECTIVE 2

GENERAL COMMENTS - TEST NO. 8 4

APPENDIX 1 - TEST NO. 8 DATA 21

APPENDIX 2 - DUMMY DATA 61

570

LIST OF FIGURES

Figure No.		Page No.
1	VEHICLE DIMENSIONS	8
2	PRE-TEST NO 8 TRANSIT BUS (FLXIBLE) EXTERIOR	9
3	POST-TEST NO. 8 TRANSIT BUS (FLXIBLE) EXTERIOR	10
4	PRE-TEST NO. 8 TRANSIT BUS (FLXIBLE) INTERIOR	11
5	POST-TEST NO. 8 TRANSIT BUS (FLXIBLE) INTERIOR	12
6	PRE-TEST NO. 8 WHEELCHAIR TIE-DOWNS AND DUMMY BELT & BAR RESTRAINTS	13
7	PRE-TEST NO. 8 WHEELCHAIR TIE-DOWNS AND DUMMY BELT AND BAR RESTRAINTS	14
8	FLEXIBLE TRANSIT BUS	15
9	ACCELEROMETER LOCATIONS AND COMPONENTS RECORDED FOR TEST NO. 8	16
10	DUMMY LOCATION AND TRANSDUCERS SIGNALS RECORDED FOR TEST NO. 8	17
11	ON-BOARD CAMERA COVERAGE FOR TEST NO. 8	18
12	OFF-BOARD CAMERA COVERAGE FOR TEST NO. 8	19

LIST OF TABLES

Table No.		Page No.
1	CRASH TEST SUMMARY	3
2	DUMMY INJURY CRITERIA VALUES	5
3	BUS TEST WEIGHT - TEST NO. 8	6
4	POST-CRASH DATA SHEET	7

570

PRESENTATION OF RESULTS

This test report presents all the test results obtained from Test No. 8 (Frontal Barrier Impact). These tests were performed on May 24, 1979 at Calspan's Crash Test Facility in Buffalo, New York. The test vehicle was a Flexible Transit Bus.

Included in this document are still photographs of pre- and post-test conditions of the test vehicle and dummies. Dummy identification and pre- and post-test positions of all dummies are presented. Instrumentation identification and locations of all transducers for all electronic data are presented along with dummy and vehicle data in a plotted format. High speed camera locations and camera speeds are listed in table form.

There were five 50 percentile, one six-year old and one 95 percentile dummies instrumented and positioned as shown in Figures 8 and 10 for this test.

Two of the Hybrid II, 50 percentile male dummies were positioned in wheechairs. The wheelchair designated position No. 3 was restrained by the wheelchair handbrake, a folding arm restraint mounted to the underside of a fold-up side facing seat and a seat belt around the seated dummy with end attachment to the vehicle structure. The other wheelchair designated position No. 6 was restrained by the handbrake of the wheelchair and a clamp on the lift side wheel of the wheelchair. The clamp was attached to the underside of a fold-up front seat directly aft of the wheelchair. A seat belt restrained the occupant of the wheelchair and had end attachments mounted to the frame of the wheelchair. The attachments on wheelchair position No. 3 all functioned properly and the chair remained in position during the impact. Wheelchair position No. 6 moved during impact due to the left wheel of the chair deforming when it was loaded.

TEST OBJECTIVES

The principal objective in performing the full-scale crash tests on the Flxible Transit Bus was to obtain a deceleration crash pulse for the vehicle and to provide a crash environment to test the following parameters:

- Performance of the wheelchair tie-down attachments as shown in Figure 6.
- Acquire injury criteria data for the on-board dummies.
- Obtain trajectory information for the on-board dummies.

574

Table 1

CRASH TEST SUMMARY

TEST NO. 8

PROJECT: MINICARS BUS TEST

DATE: 5/24/79

TIME: 14:35

TEMP: 54°F

TEST CONDITION: FRONTAL PERPENDICULAR FIXED BARRIER

VEHICLE FLXIBLE TRANSIT BUS

TEST WEIGHT (lbs)	22,170
IMPACT ANGLE (deg)*	0
IMPACT VELOCITY (mph)**	21.11
MAX. CRUSH (in)	24.31
MAX. INTRUSION (in)	--

DUMMIES

TYPE	5 - 50% 1 - 95% & 1 - 6-YEAR OLD
LOCATION	SEE FIGURE
RESTRAINT	SEE FIGURE

NUMBER OF DATA CHANNELS 72

NUMBER OF HIGH SPEED CAMERAS 12 & 1 Real Time

---

*With respect to tow track Centerline

**Speed trap measurement (± .05% accuracy)

GENERAL COMMENTS - TEST NO. 8

Dummy No. 2 loaded bar at side; bar then broke away from wall and floor.

Floor split aft of side facing seats and just aft of driver pedestal.

Curb side windows opened on impact.

Front windows came out of frame.

Front wheel wells sprung open and front wheels were visible from inside bus.

Table 2

DUMMY INJURY CRITERIA VALUES

BUS TEST NO. 8

	MAXIMUM ACCELERATION (G)*								SEVERITY INDEX	
	X	Y	Z	R	X	Y	Z	R	HEAD	CHEST
DUMMY (1)	-80	22	35	120	-11	13	45	46	7000	153.7
*DUMMY (2)	- 2	-12	2	15	- 3	14	5	9	86.4	44.4
DUMMY (3)	-13	- 8	15	25	-10	-5	8	10	136.3	41.1
DUMMY (4)	-16	- 2.8	27	27	10	10	4	10	129.6	21.2
DUMMY (5)	11	4	8	5	-16	-8	9	17	23.0	39.4
DUMMY (6)	- 7	- 4	17	12	-12	4	9	15	64.5	31.1
*DUMMY (7)	38	18	8	75	10	-20	7.5	22	582.8	54.2

	MAXIMUM FORCE - SEAT BELT LOADS (LBS)	
	RIGHT BELT LOADS	LEFT BELT LOAD
DUMMY (1)	430	550
DUMMY (2)	862	800
DUMMY (7)	400	1500

	MAXIMUM FORCE - FEMUR LOADS (LBS)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY 3	300	490
DUMMY 5	50	75

	HEAD INJURY CRITERIA**			AVE. ACC. (G) t_1 TO t_2
	HIC	t_1(SEC)	t_2(SEC)	
DUMMY (1)	5646	.111	.113	353.7
*DUMMY (2)	56.7	.062	.079	25.8
DUMMY (3)	114.1	.134	.215	18.2
DUMMY (4)	95.0	.110	.207	15.8
DUMMY (5)	13.1	.0199	.2997	4.7
DUMMY (6)	54.9	.142	.2997	10.4
*DUMMY (7)	470.0	.085	.0897	96.8

* DEFINED AS EXCEEDING .003 SEC. DURATION

**AS DEFINED IN FMVSS 208

Table 3

BUS TEST WEIGHT - TEST NO. 8

Left Front	4020	lbs	Left Rear	7520	lbs
Right Front	3500	lbs	Right Front	7130	lbs
TOTAL FRONT	7520	lbs	TOTAL REAR	14650	lbs

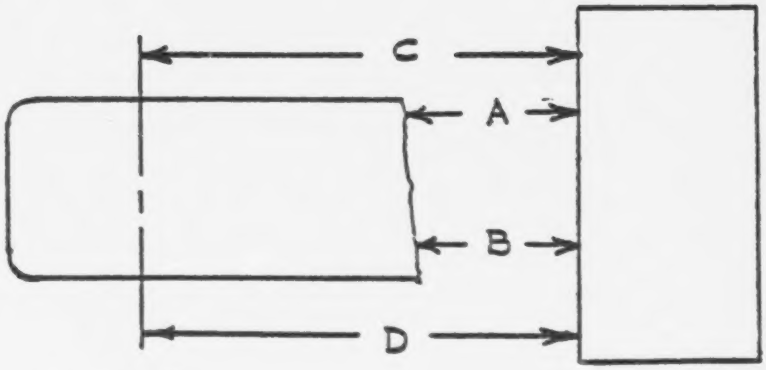
Total Weight = 7520 + 14650 = 22170 lbs

Wheel Base = 286 inches

$$Cg_{F.W.} = \frac{14650 \text{ lbs} \cdot 286 \text{ inches}}{22170 \text{ lbs}} = 188.98 \text{ inches}$$

Table 4

POST-CRASH DATA SHEET



16 FT.
MARK

DIMENSIONS:

A = 16.25 INCHES

B = 16.375 INCHES

C = 184.0 INCHES

D = 184.5 INCHES

AVERAGE REBOUND = 16.31 INCHES

LEFT SIDE CRUSH = 24.25 INCHES

RIGHT SIDE CRUSH = 24.375 INCHES

AVERAGE CRUSH = 24.31 INCHES

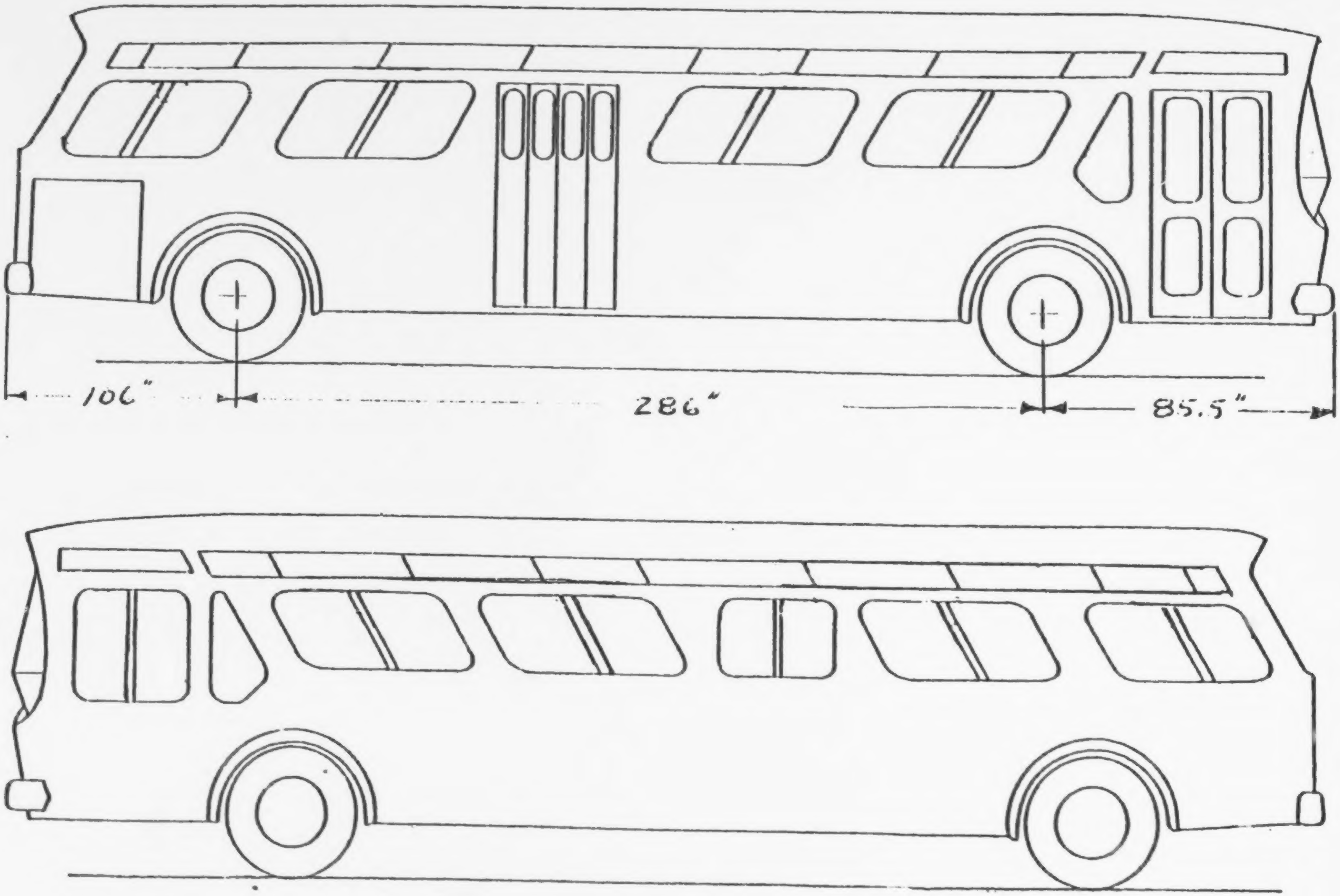


FIGURE 1 VEHICLE DIMENSIONS

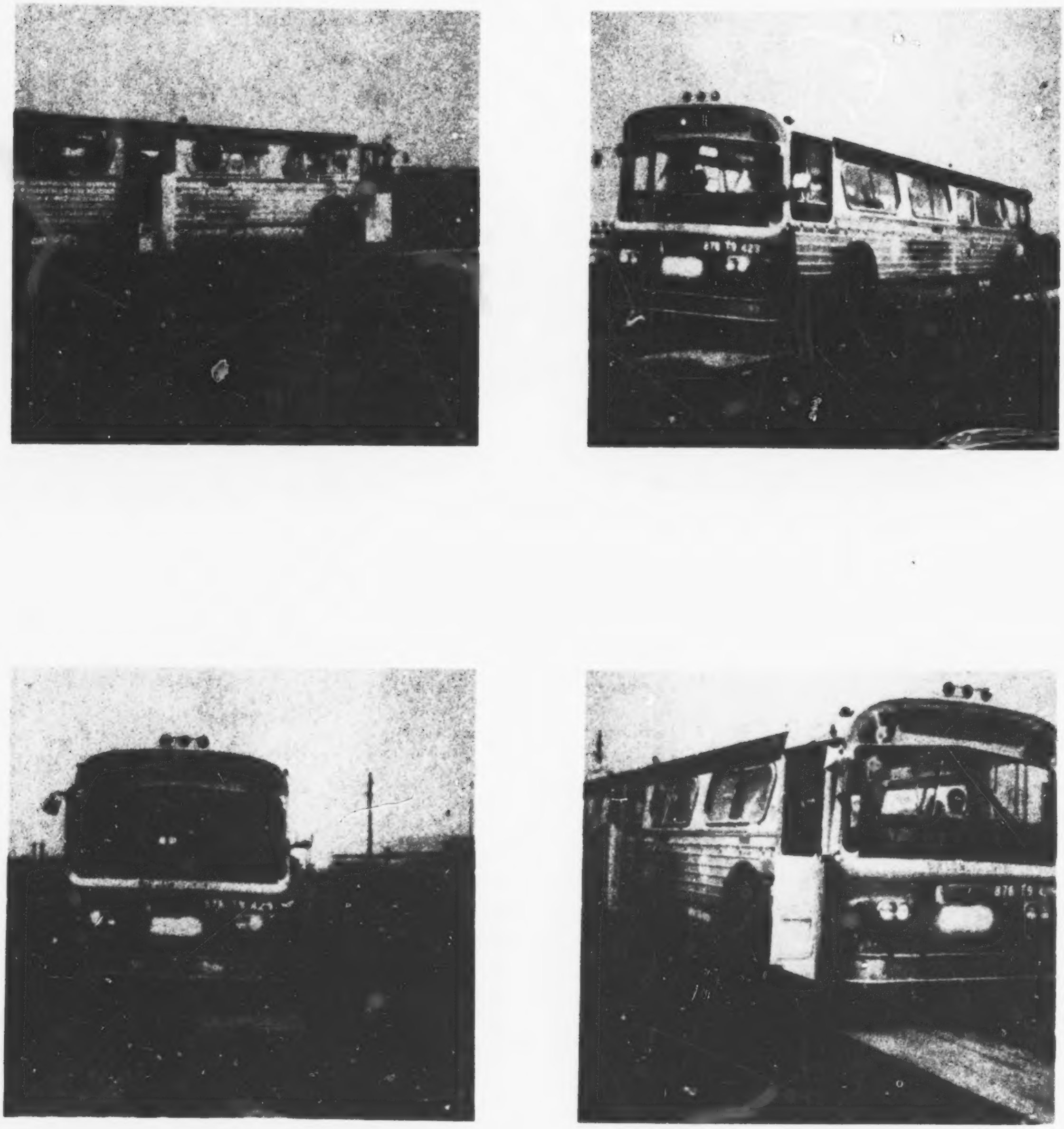


FIGURE 2 PRE-TEST NO. 8 TRANSIT BUS (FLEXIBLE) EXTERIOR

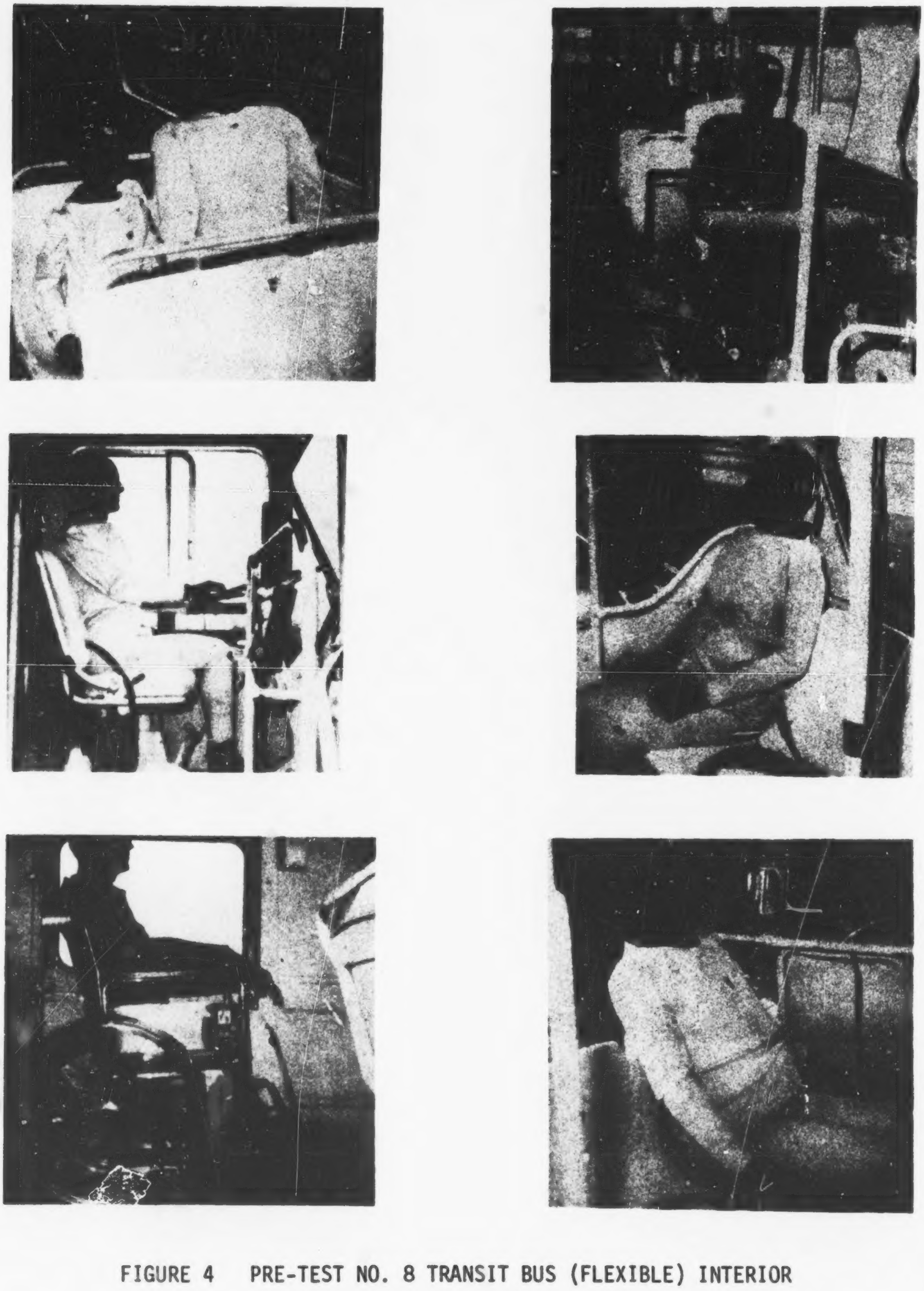


FIGURE 4 PRE-TEST NO. 8 TRANSIT BUS (FLEXIBLE) INTERIOR

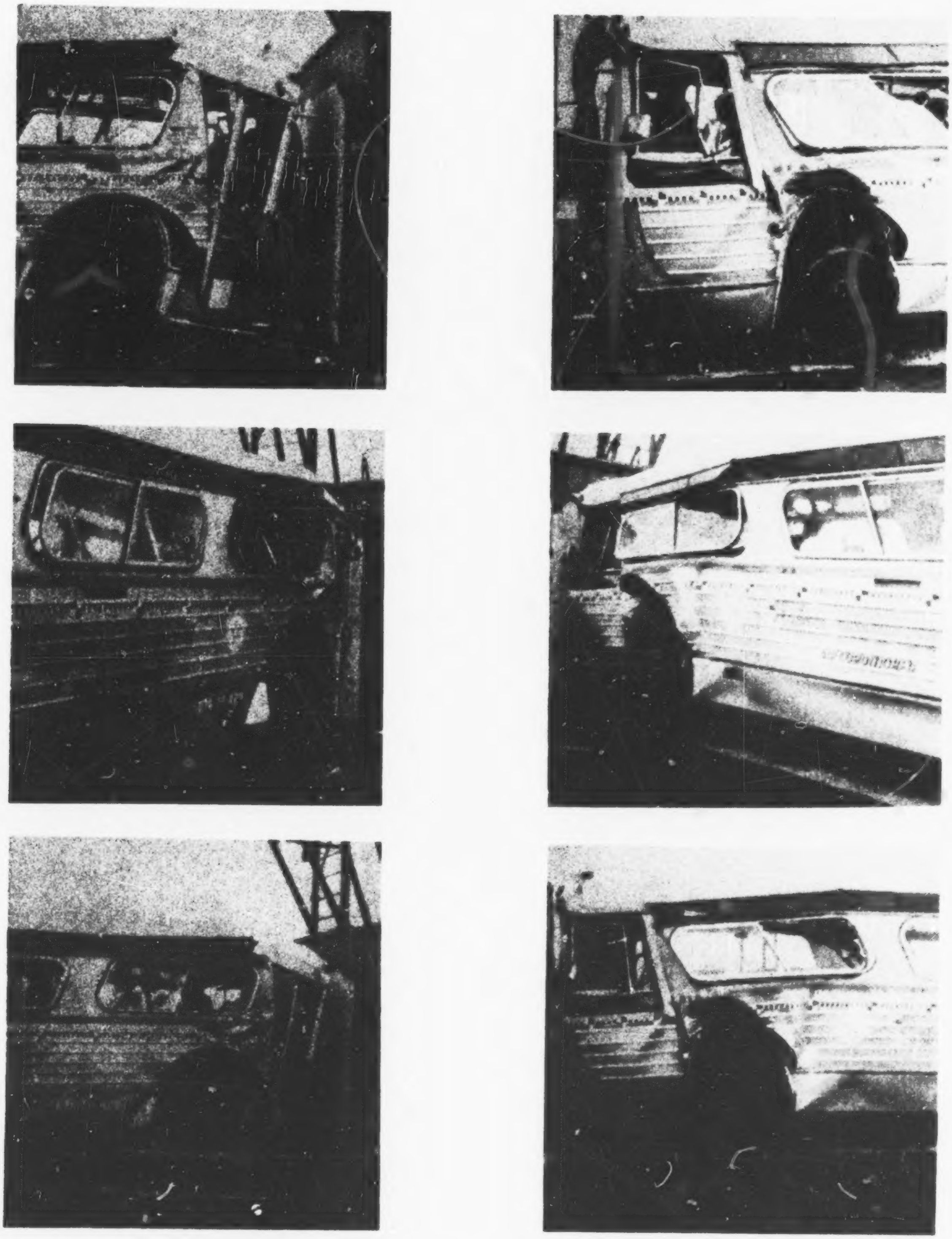


FIGURE 3 POST-TEST NO. 8 TRANSIT BUS (FLEXIBLE) EXTERIOR

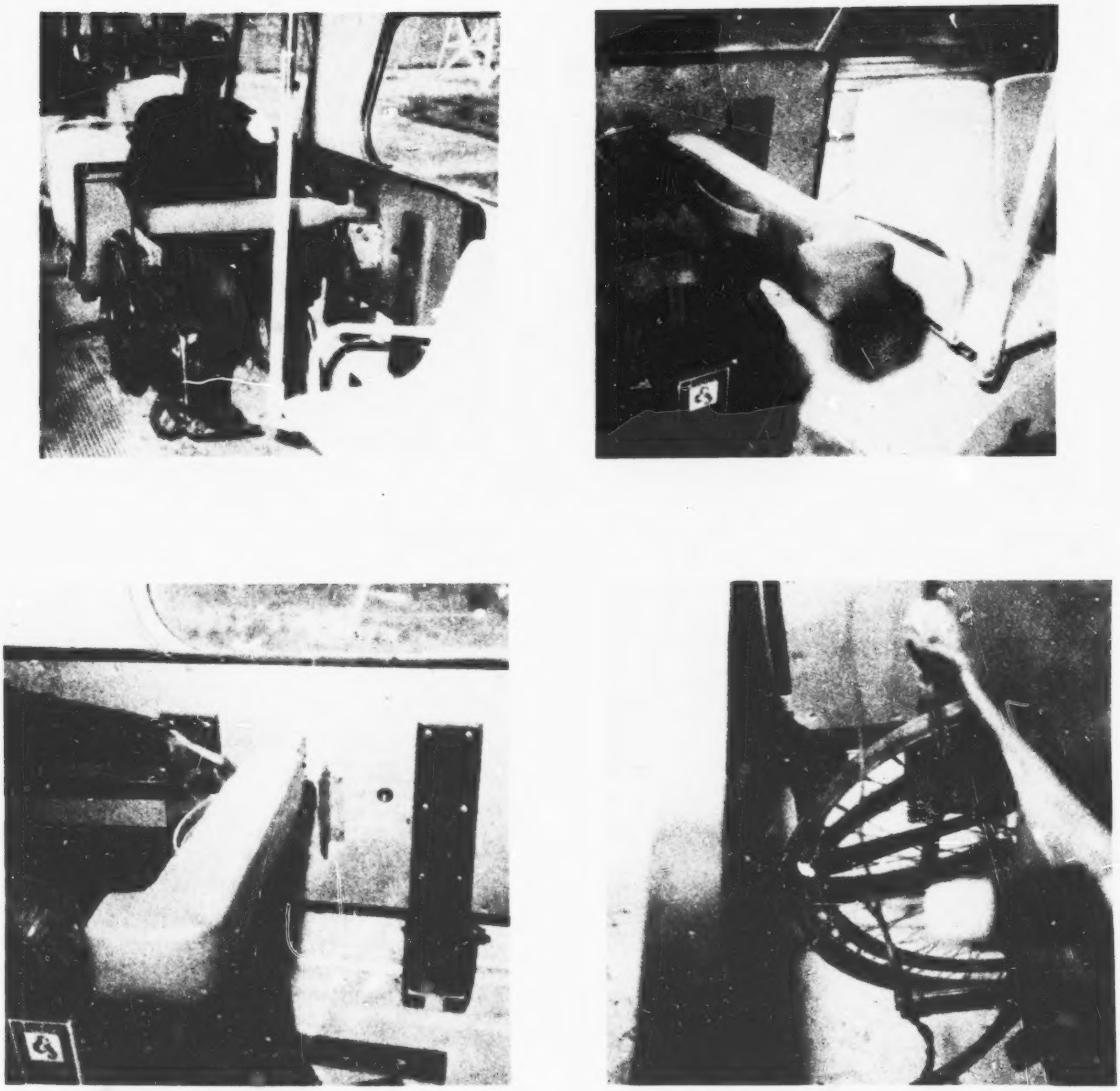
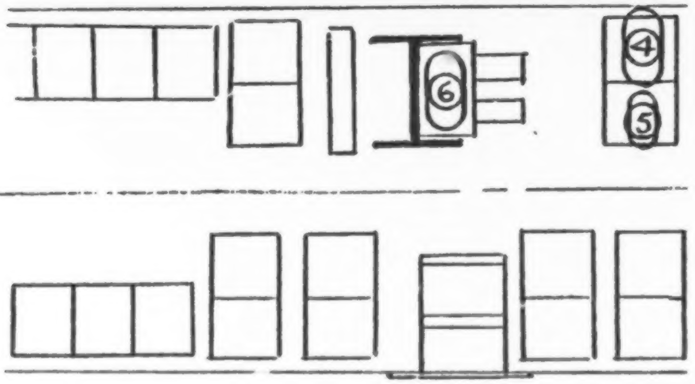


FIGURE 6 PRE-TEST NO. 8 WHEECHAIR TIE-DOWNS AND DUMMY BELT & BAR RESTRAINTS

FIGURE 5 POST-TEST NO. 8 TRANSIT BUS (FLEXIBLE) INTERIOR

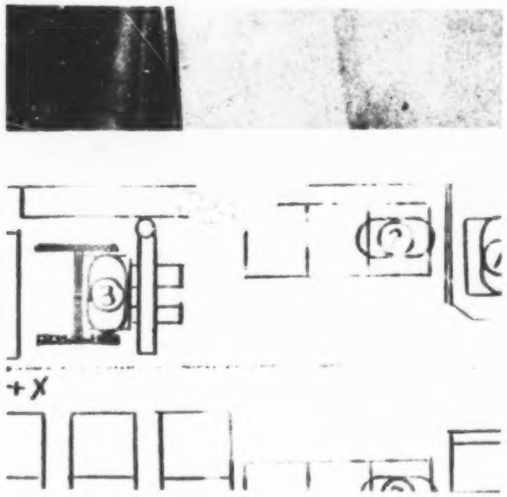
6440-V-5

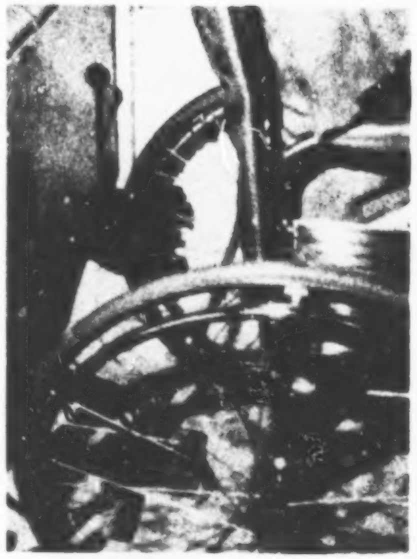


ALL DIMENSI(

DUMMY POSITION		HEAD POINT (INCHES) X	Y	Z	H-
(1)	PRE	+231-1/2	+22-1/4	+49-1/2	+23
	POST	+242-1/2	+21	+43-3/4	+22
(2)	PRE	+204	+41-1/2	+43-3/4	+20
	POST	+210	+26-1/4	+47-1/2	+20
(3)	PRE	+126	+22-1/2	+48-1/2	±13
	POST	+130-1/2	+16-1/2	+42-1/4	+12
(4)	PRE	+ 58-1/2	+30-1/2	+45-1/2	± 6
	POST	+119-1/2	+33-1/4	+30-1/2	± 8
(5)	PRE	+ 56-1/2	+18-1/4	+34-1/4	± 6
	POST	+ 83	-18	+ 4-1/2	± 8
(6)	PRE	+ 5-1/4	±18	+47-1/2	± 1
	POST	+ 33-1/4	+19-1/4	+39	± 1
(7)	PRE	+203-1/2	-37-1/2	+45-1/2	+20
	POST	+181-1/2	+ 6-3/4	+ 6-3/4	+2(

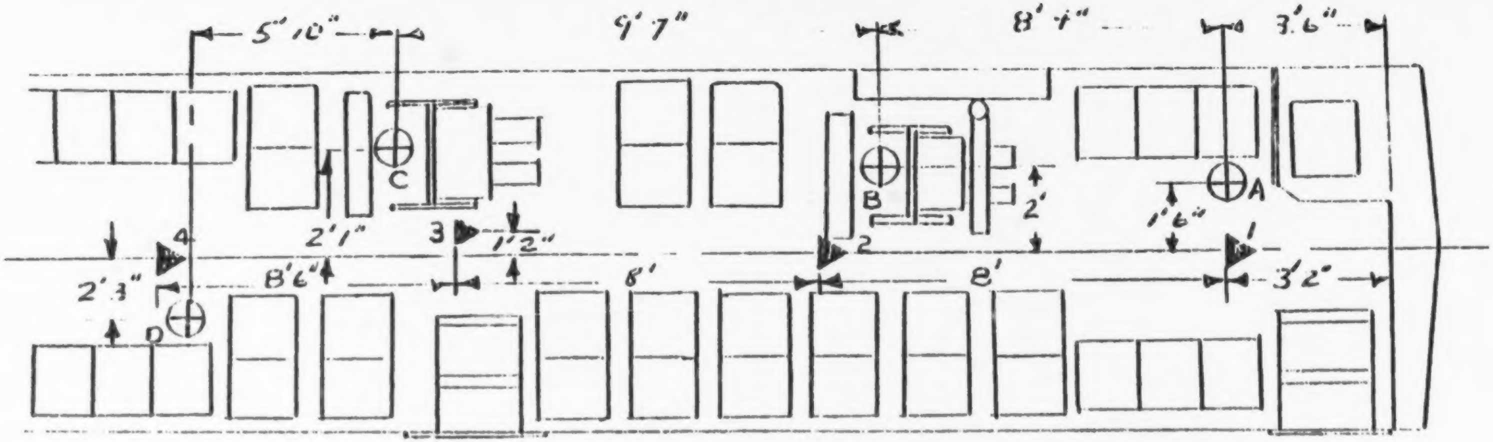
FIGURE 8 IFLX





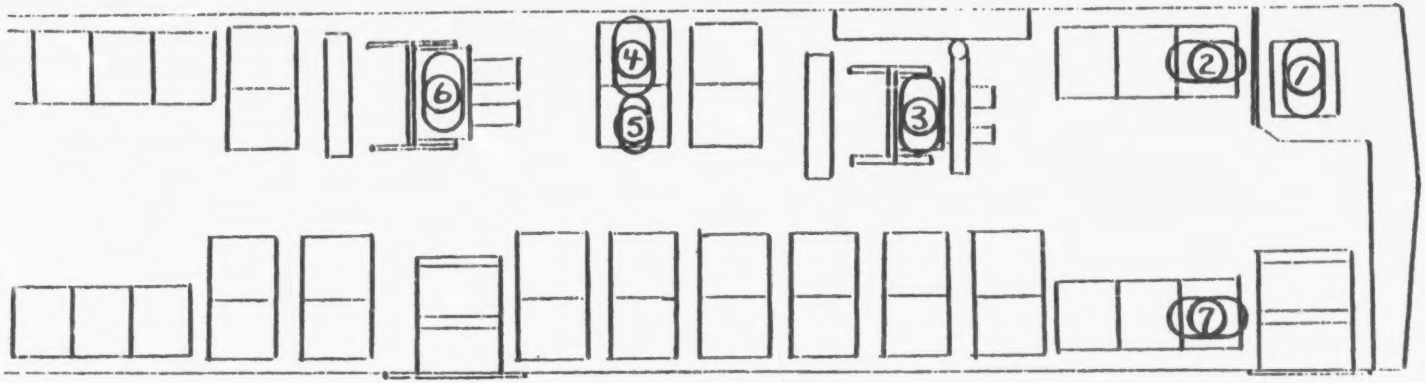
HES)	Z	KNEE P NT (INCH X	
	+20-1/2	+249-1/4	[illegible]
-1/2	+22-1/2	+239-1/2	[illegible]
	+20	+204	[illegible]
	+26-1/2	+203-3/4	
-1/4	+21	+145-3/4	[illegible]
-3/4	+20-1/2	+142-1/2	+21
	+19-3/4		[illegible]
-3/4	+40-1/2		+28-1/2
-1/2	+18-1/4		+16-1/

[illegible] NNS AND DUMMY


5'10"
9'7"
8'4"
3'6"
C
B
A
2'
1'6"
1
2
3
4
2'1"
1'2"
2'3"
D
8'6"
8'
8'
3'2"

ACCELEROMETER NO.	ACCEL. COMP.
1	X, Y, Z
2	X, Y, Z
3	X, Y, Z
4	X, Y, Z
A	X Z
B	X Z
C	X Z
D	X Z

FIGURE 9 ACCELEROMETER LOCATIONS AND COMPONENTS RECORDED FOR TEST NO. 8

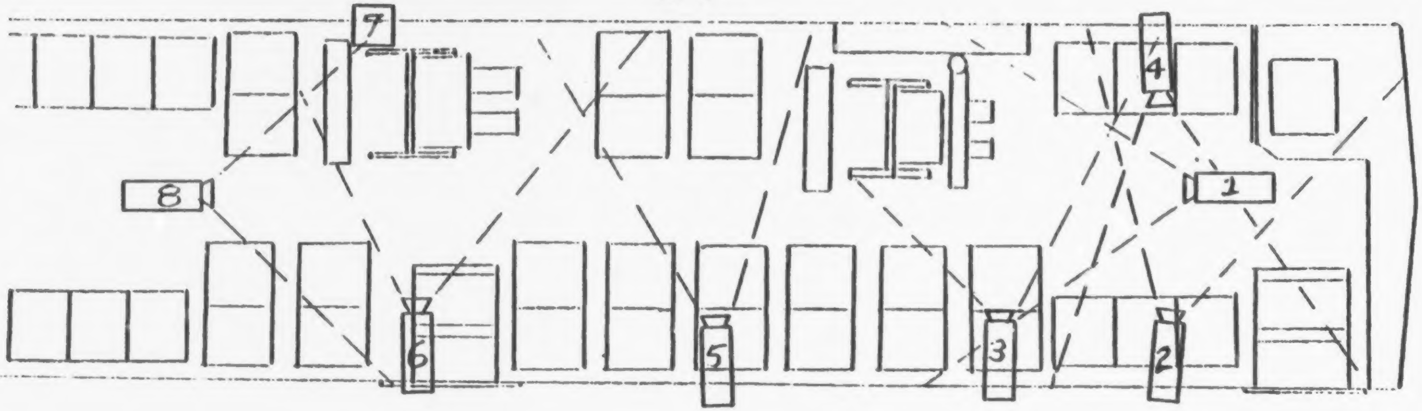


DUMMY POSITION & TYPE		TRANSDUCERS HEAD (ACCEL.)	CHEST (ACCEL.)	FEMUS (LOAD)	BELTS (LOADS)
(1)	50%	X, Y, Z	X, Y, Z	--	RIGHT, LEFT
(2)	95%	X, Y, Z	X, Y, Z	--	---
(3)	50%	X, Y, Z	X, Y, Z	--	RIGHT, LEFT
(4)	50%	X, Y, Z	X, Y, Z	RIGHT, LEFT	---
(5)	6-YEAR OLD	X, Y, Z	X, Y, Z	--	---
(6)	50%	X, Y, Z	X, Y, Z	--	---
(7)	50%	X, Y, Z	X, Y, Z	RIGHT, LEFT	---

6440-V-5

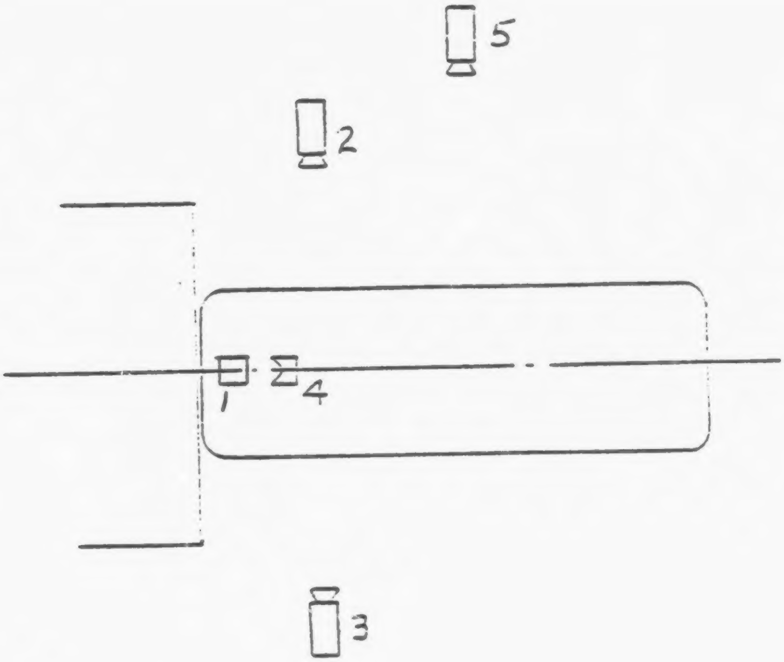
FIGURE 10 DUMMY LOCATION AND TRANSUDCERS SIGNALS RECORDED FOR TEST NO. 8

590



LOC. NO.	TYPE	LENS (MM)	SPEED (fps)
1	STALEX	8	1430
2	PHOTOSONICS	8	970
3	PHOTOSONICS	8	1240
4	STALEX	8	1310
5	STALEX	8	1000
6	STALEX	8	430
7	STALEX	8	390
8	STALEX	8	1180

FIGURE 11 ON-BOARD CAMERA COVERAGE FOR TEST NO. 8



LOC. NO.	LOCATION	CAMERA TYPE	LENS (MM)	SPEED (FPS)
1	OVERHEAD	PHOTOSONIC	13	700
2	SOUTH CLOSE	PHOTOSONIC	25	560
3	NORTH CLOSE	PHOTOSONIC	25	530
4	PIT	PHOTOSONIC	13	670
5	SOUTH CLOSE	REAL TIME	--	24

FIGURE 12 OFF-BOARD CAMERA COVERAGE FOR TEST NO. 8

BLANK PAGE

APPENDIX 1

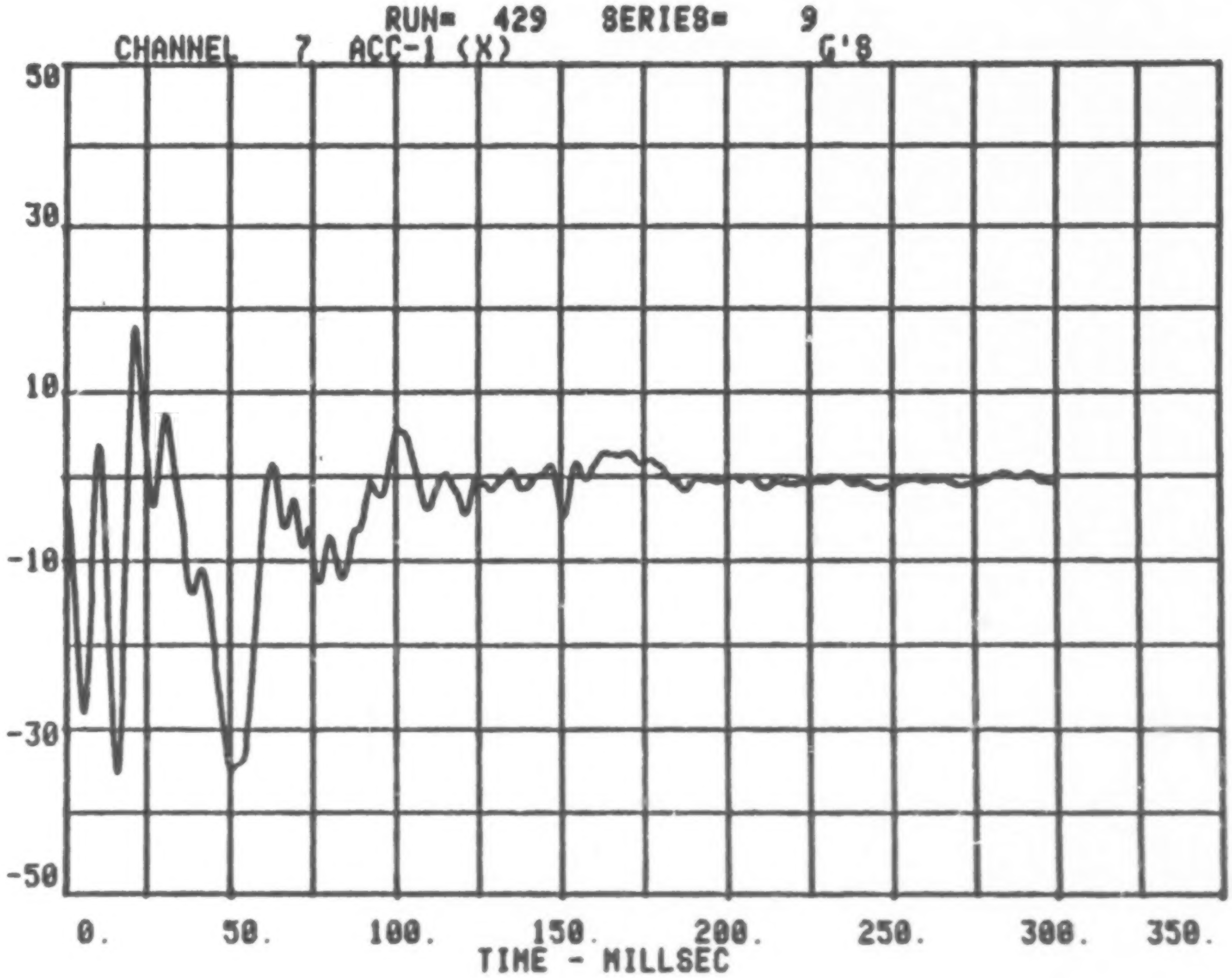
TEST NO. 8 DATA

	FILTER CHANNEL CLASS
VEHICLE DATA	60
HEAD ACCELERATION	1000
CHEST ACCELERATION	180
BELT LOADS	60
FEMUR LOADS	600

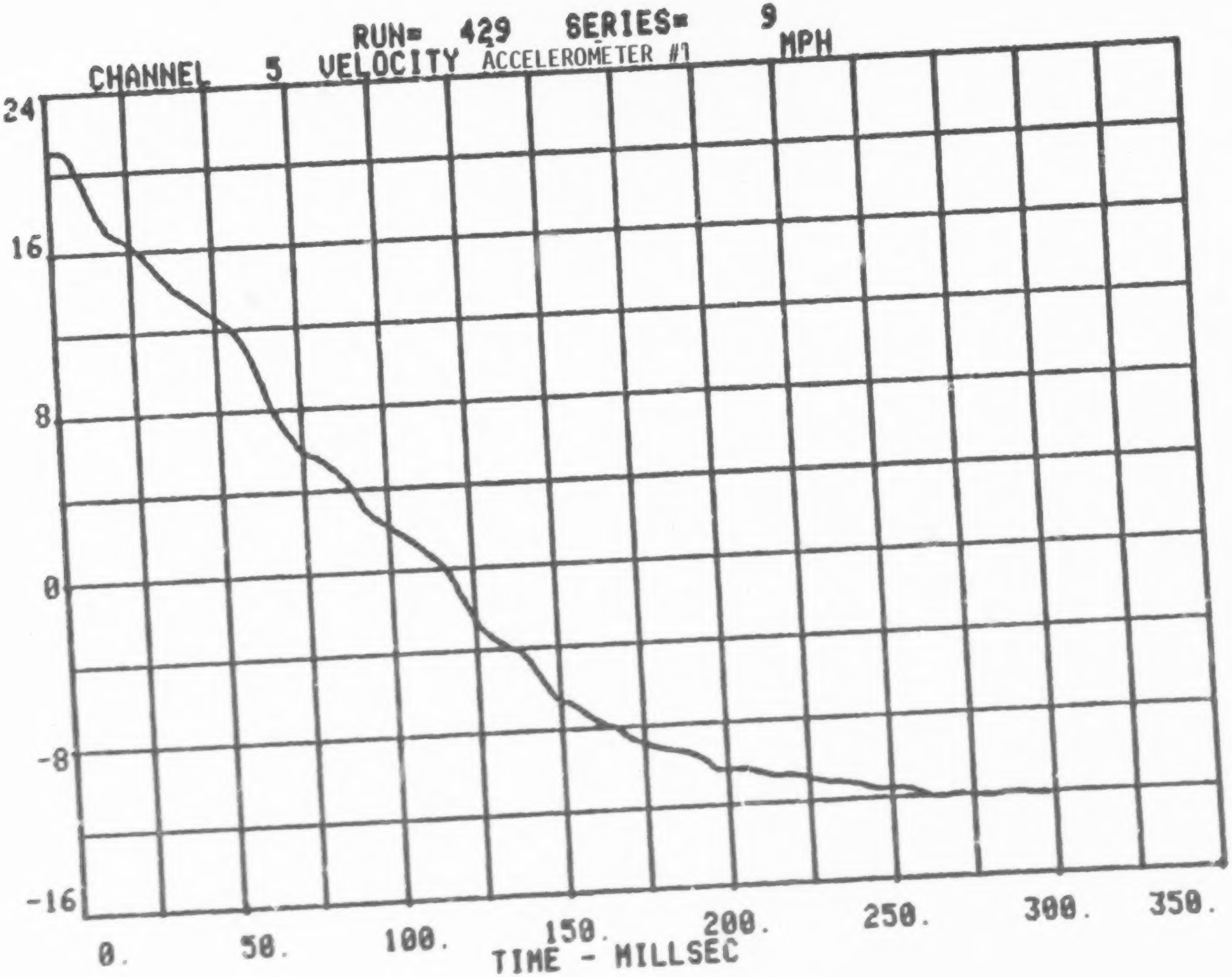
BLANK PAGE

VEHICLE DATA

596


RUN= 429 SERIES= 9
CHANNEL 7 ACC-1 (X) G'S
50
30
10
-10
-30
-50
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

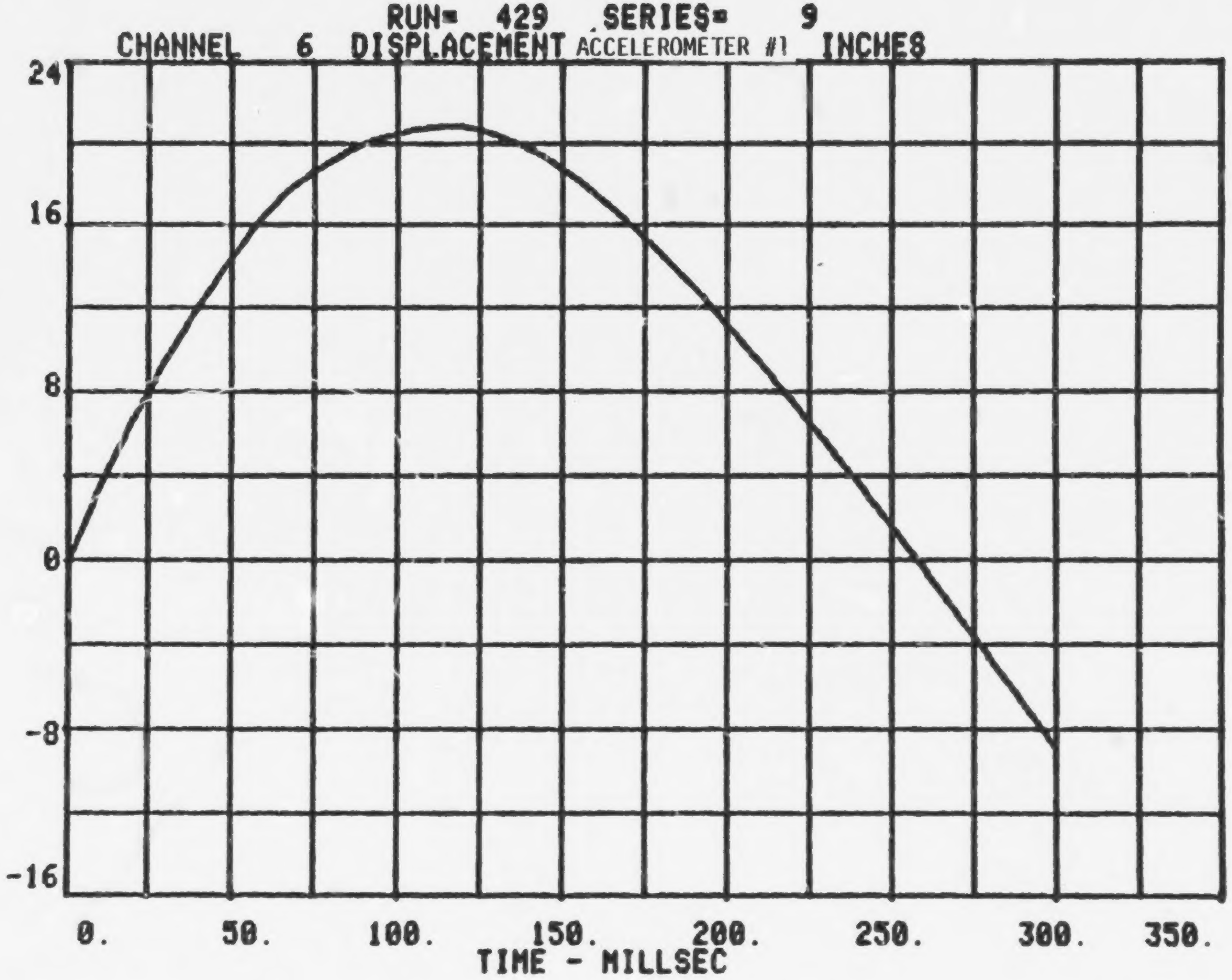


RUN= 429 SERIES= 9
CHANNEL 5 VELOCITY ACCELEROMETER #1 MPH
24
16
8
0
-8
-16
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

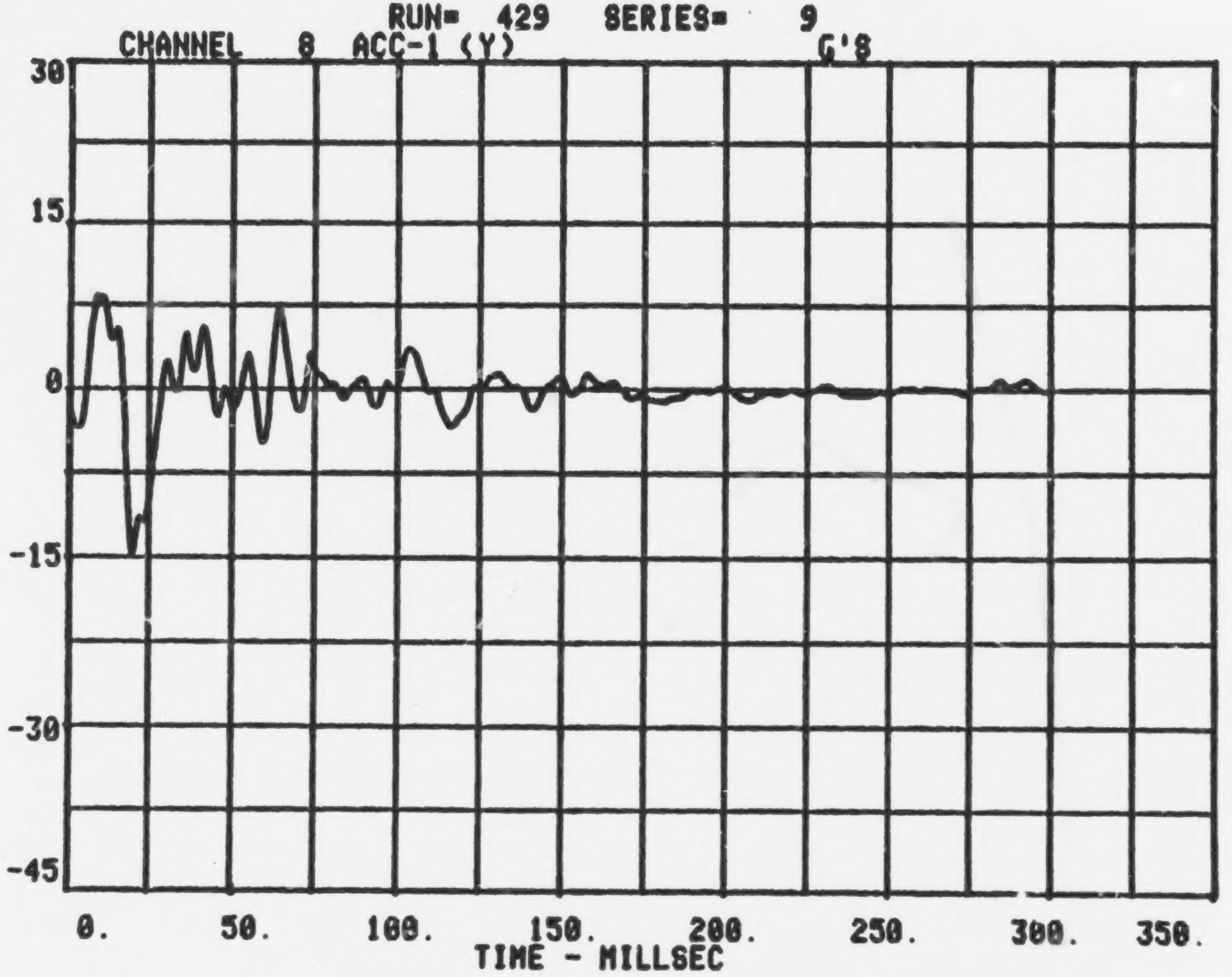
6440-V-5

597

598

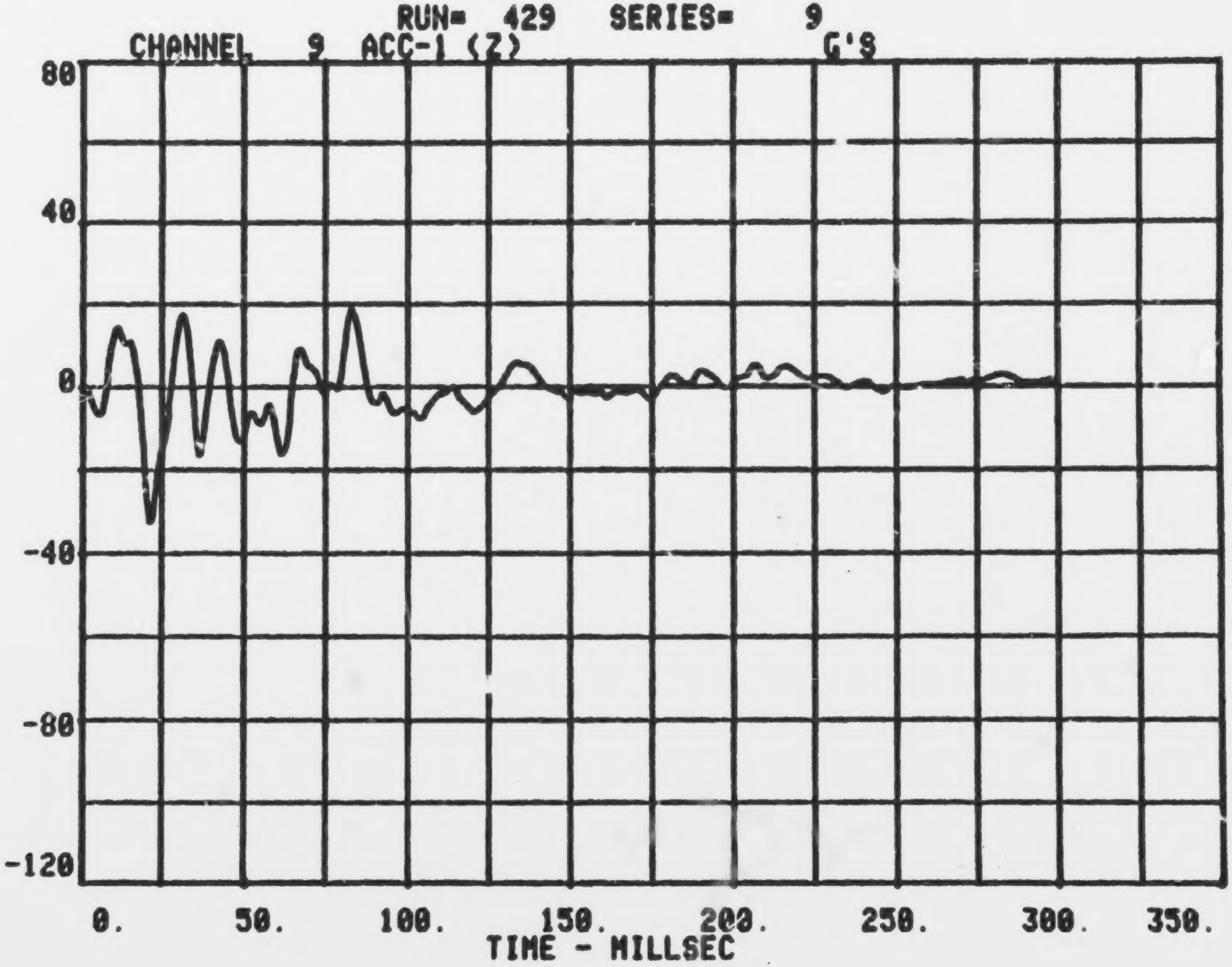

RUN= 429 SERIES= 9
CHANNEL 6 DISPLACEMENT ACCELEROMETER #1 INCHES
24
16
8
0
-8
-16
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

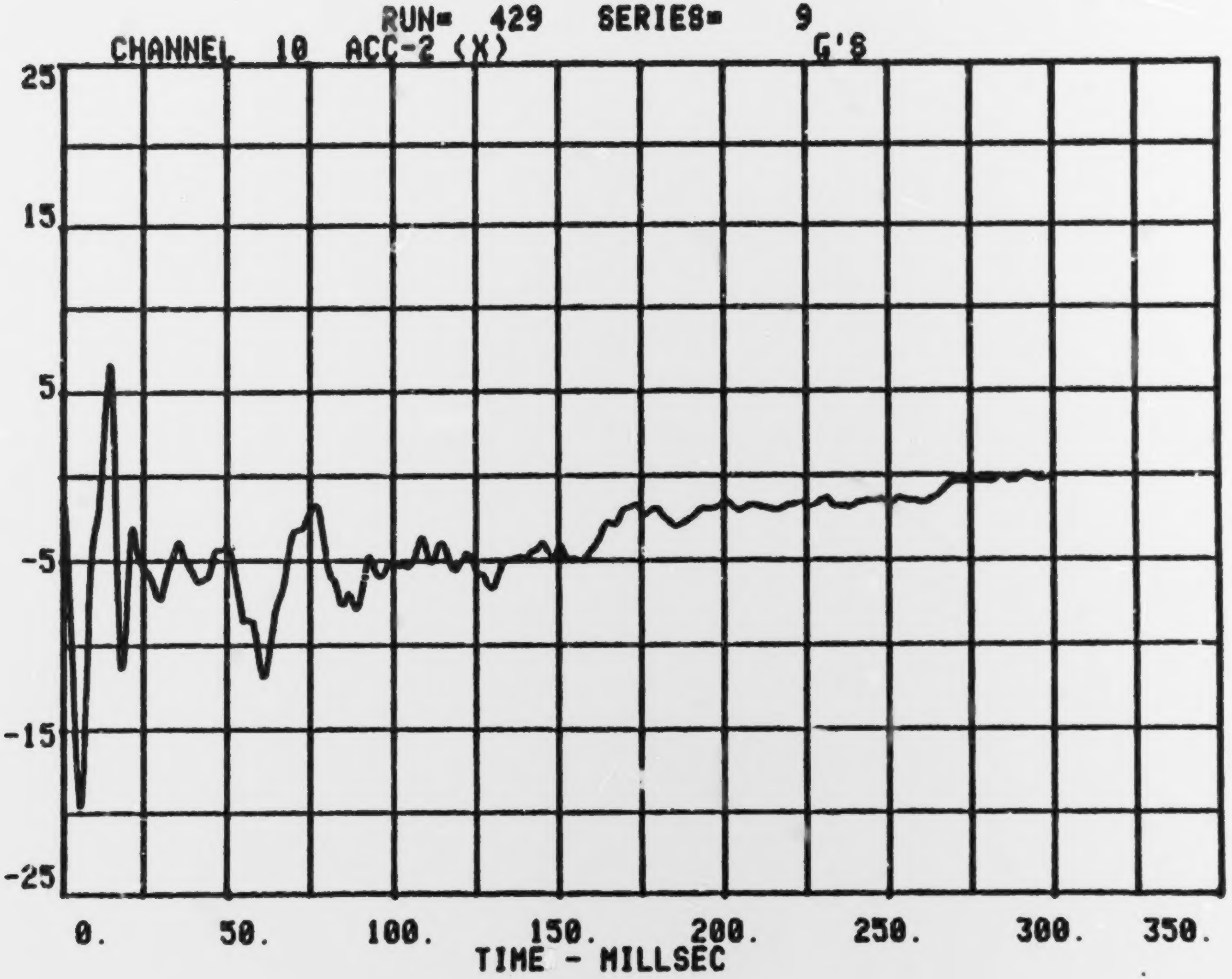

RUN= 429 SERIES= 9
CHANNEL 8 ACC-1 (Y) G'S
30
15
0
-15
-30
-45
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

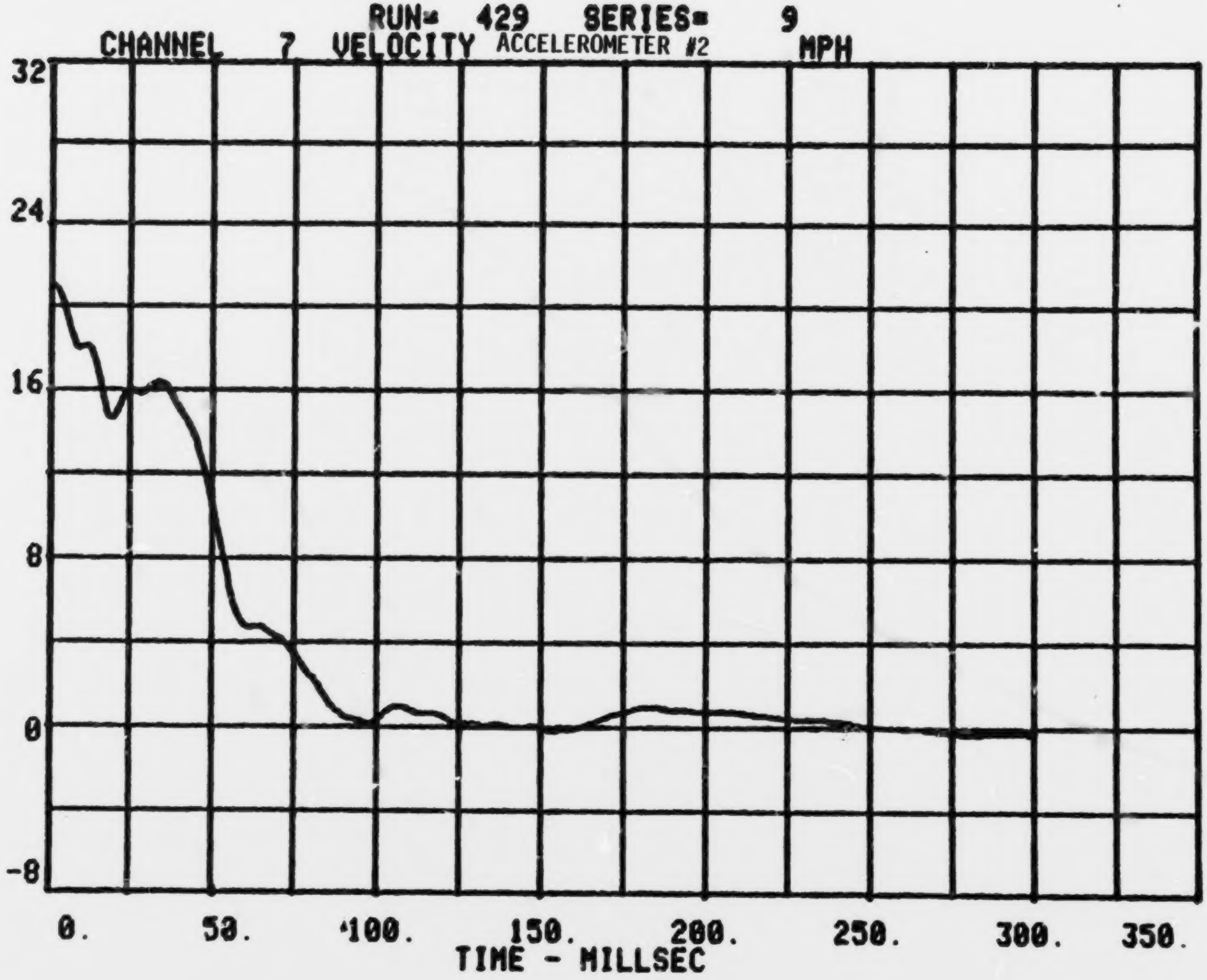
600


RUN= 429 SERIES= 9
CHANNEL 9 ACC-1 (Z) G'S
80
40
0
-40
-80
-120
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

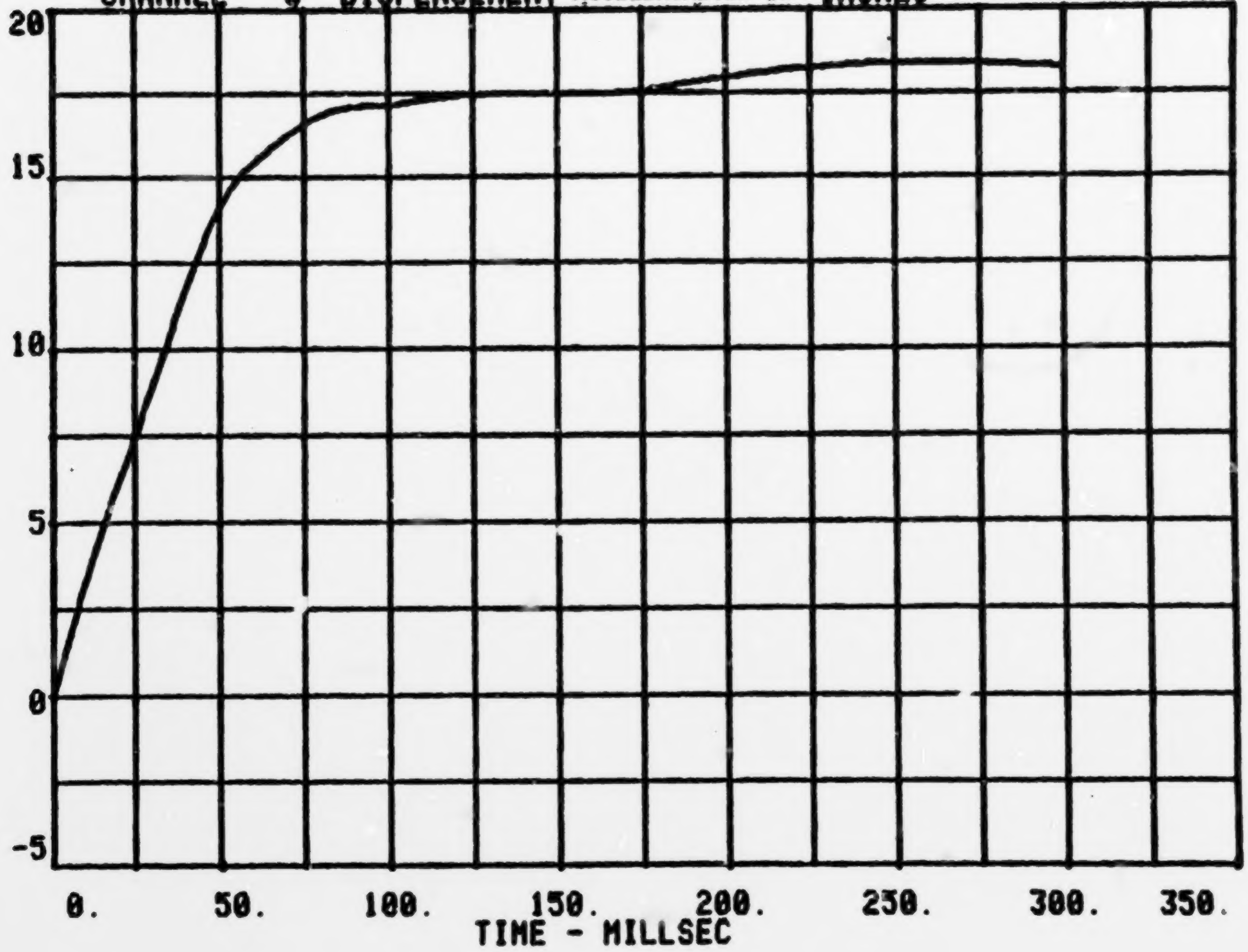

RUN= 429 SERIES= 9
CHANNEL 10 ACC-2 (X)
G'S
25
15
5
-5
-15
-25
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5


RUN= 429 SERIES= 9
CHANNEL 7 VELOCITY ACCELEROMETER #2 MPH
32
24
16
8
0
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

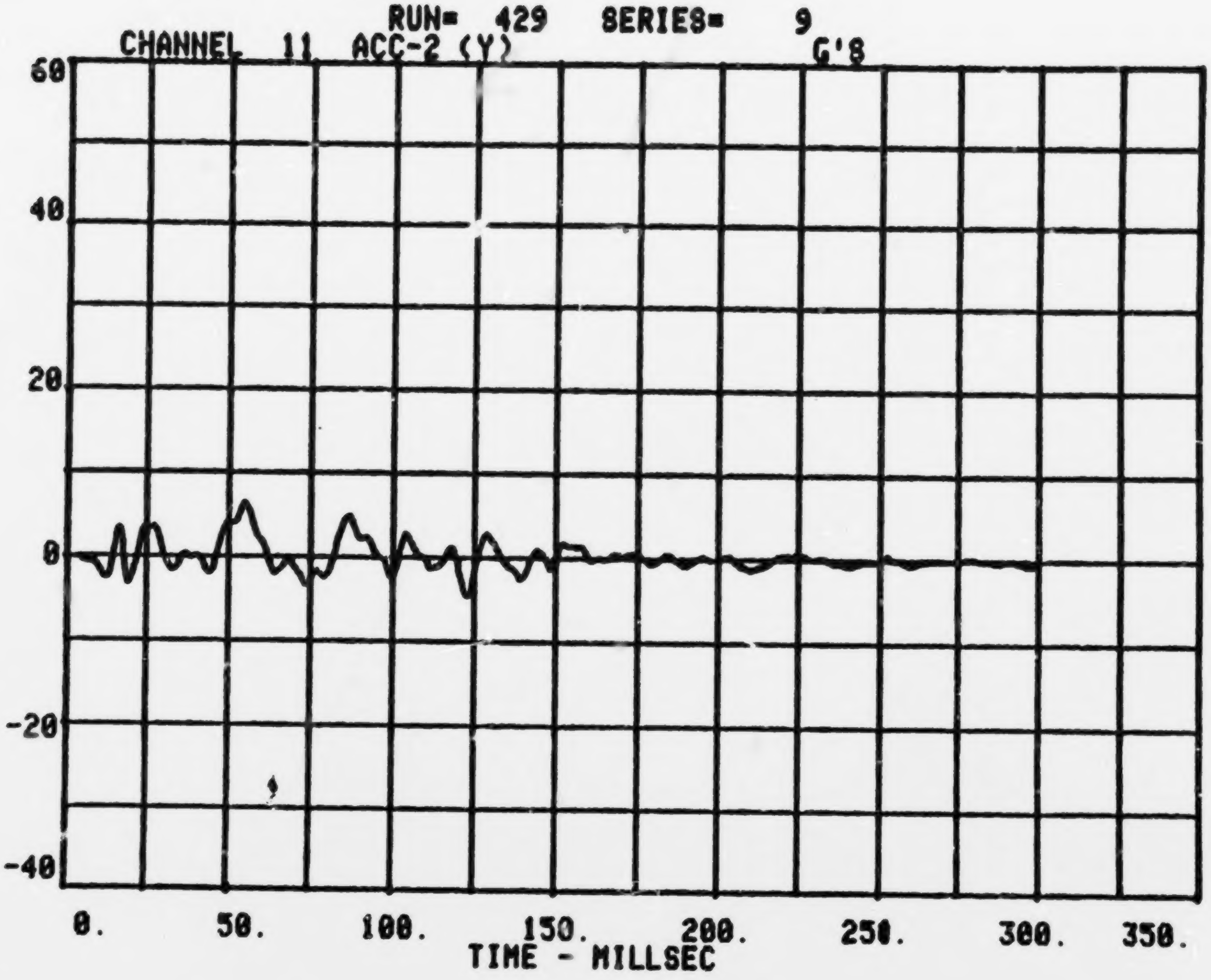
C10-V-5

RUN= 429 SERIES= 9
CHANNEL 8 DISPLACEMENT ACCELEROMETER #2 INCHES

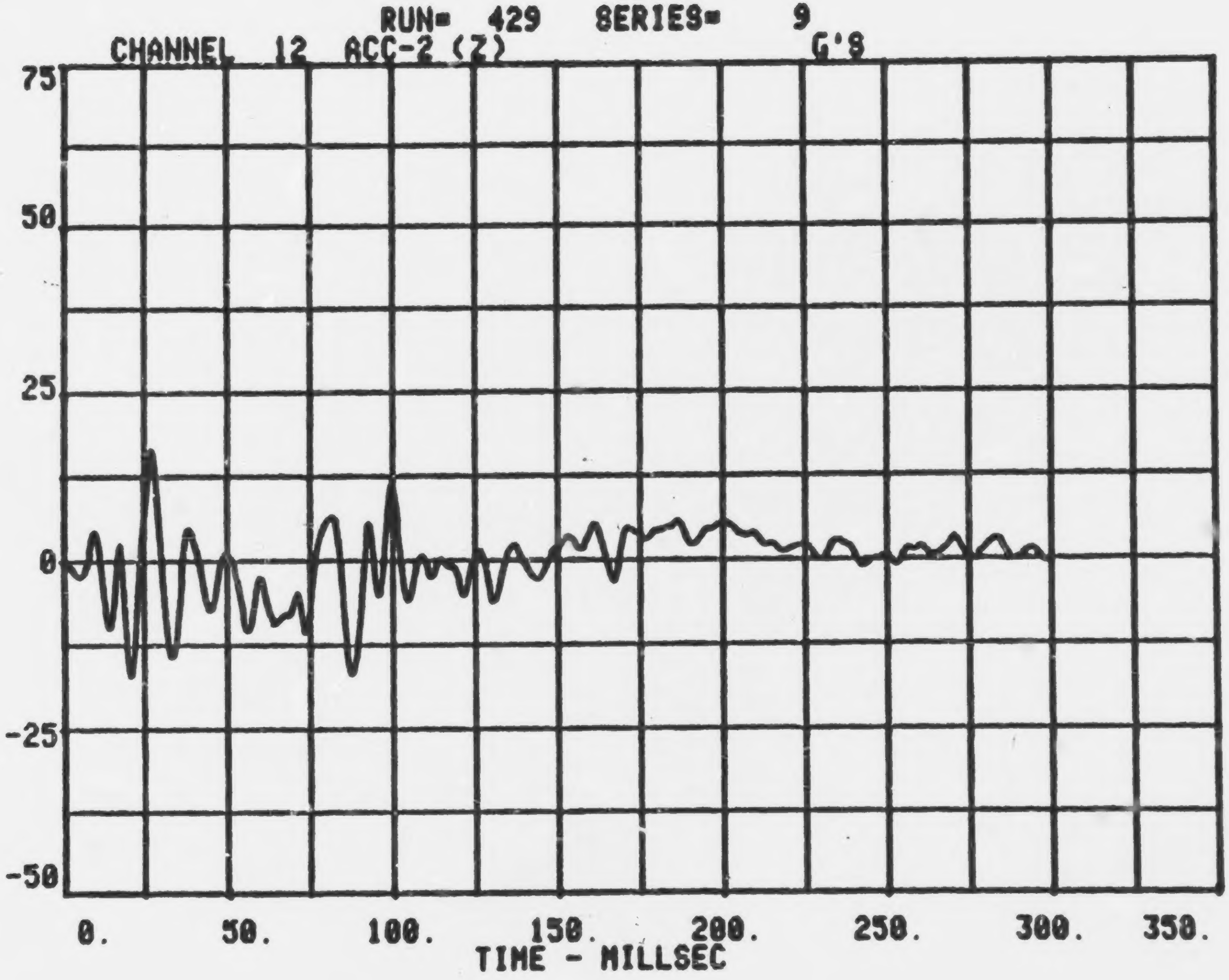


6440-V-5

604


RUN= 429 SERIES= 9
CHANNEL 11 ACC-2 (Y)
G'S
60
40
20
0
-20
-40
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

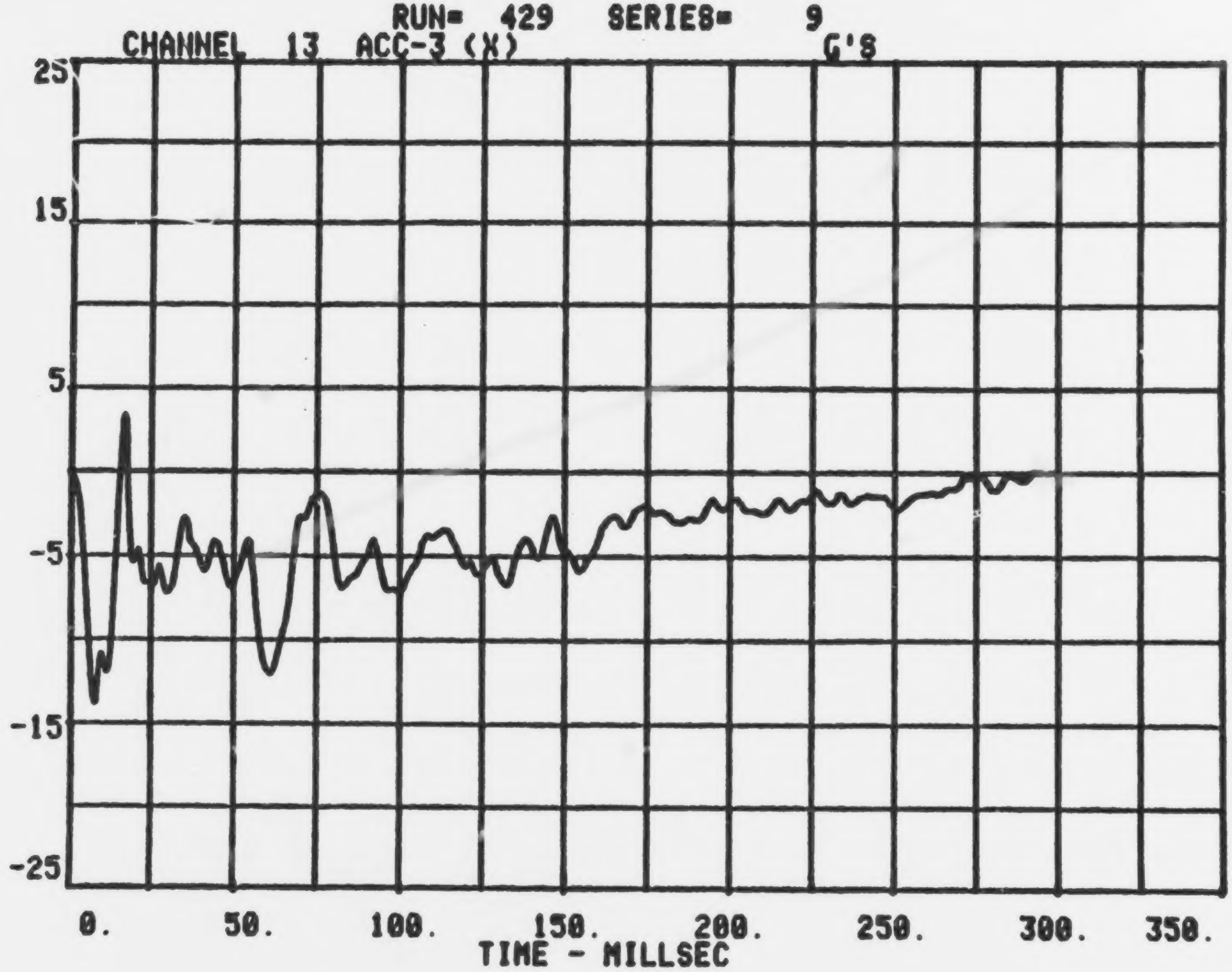
6440-V-5


RUN= 429 SERIES= 9
CHANNEL 12 ACC-2 (Z)
G'S
75
50
25
0
-25
-50
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

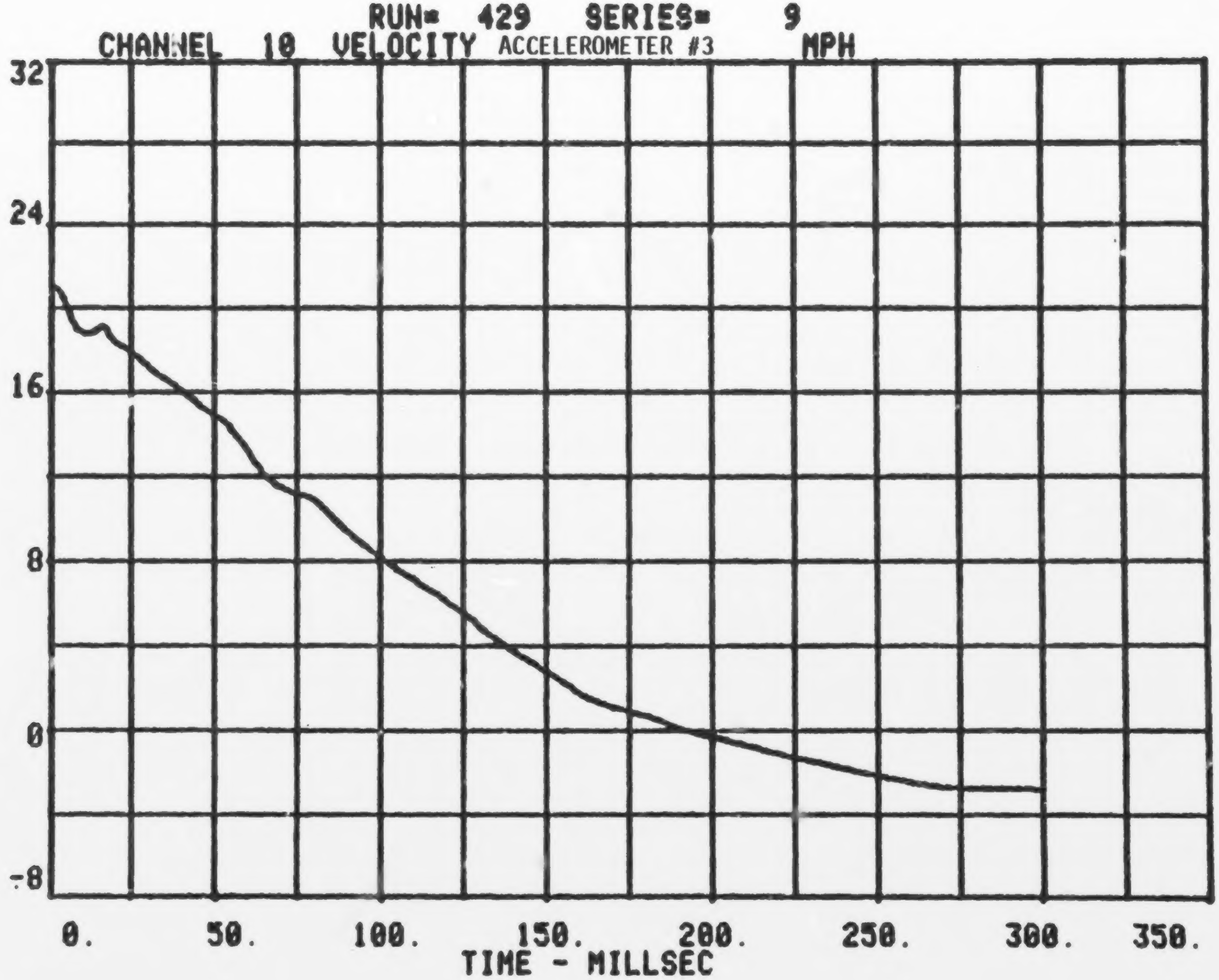
6440-V-5

605

606

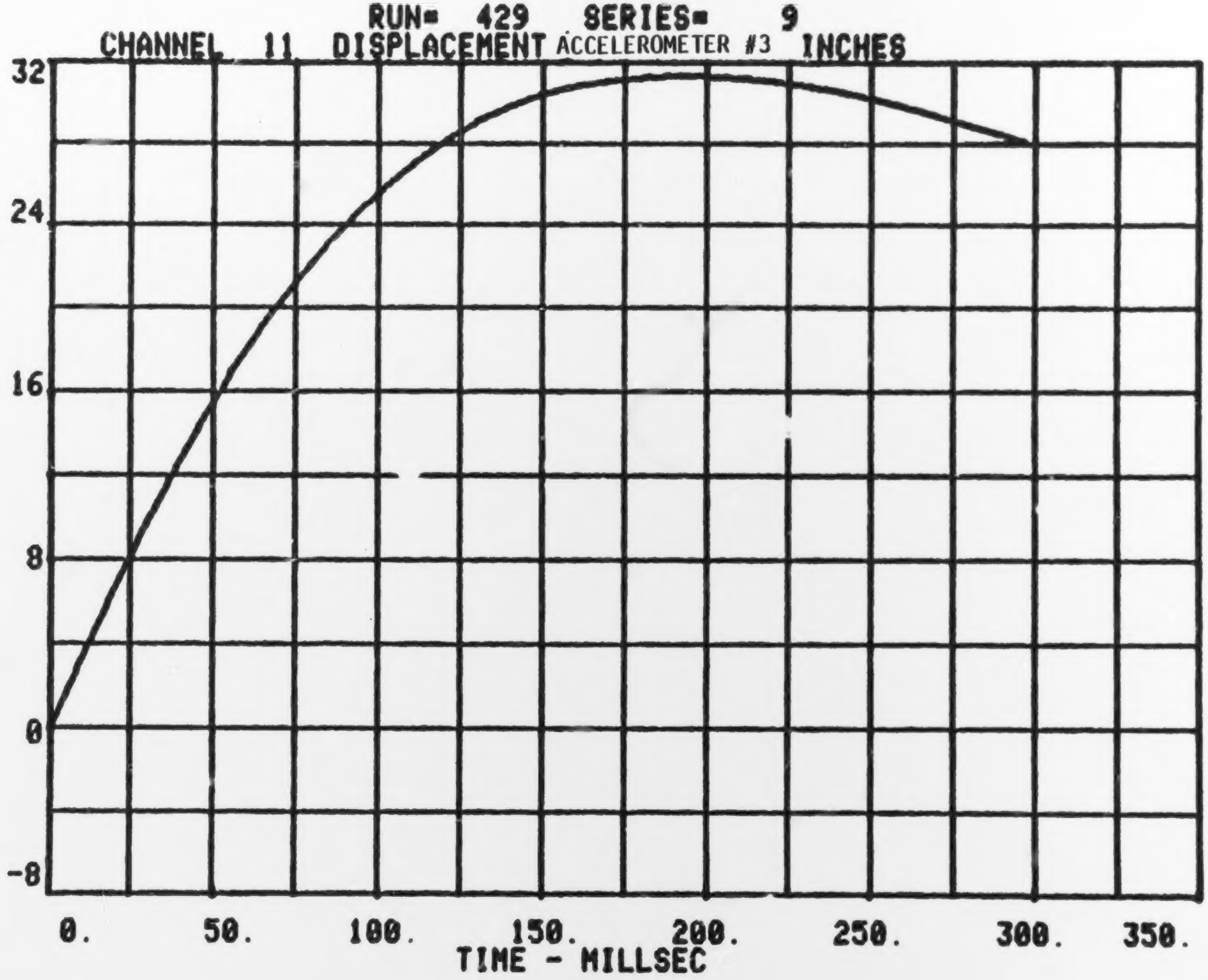

RUN= 429 SERIES= 9
CHANNEL 13 ACC-3 (X)
G'S
25
15
5
-5
-15
-25
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

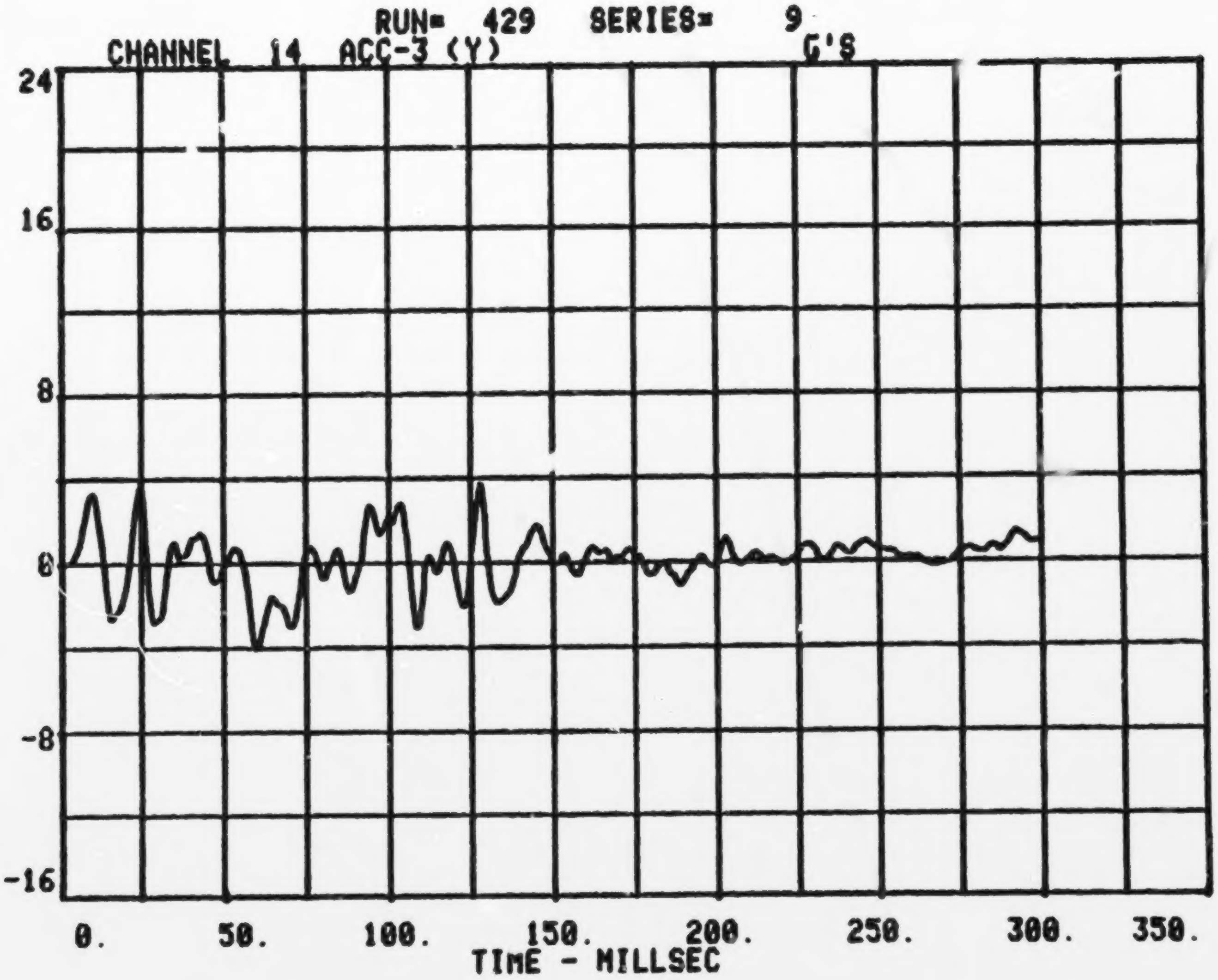

RUN= 429 SERIES= 9
CHANNEL 10 VELOCITY ACCELEROMETER #3 MPH
32
24
16
8
0
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

607

608

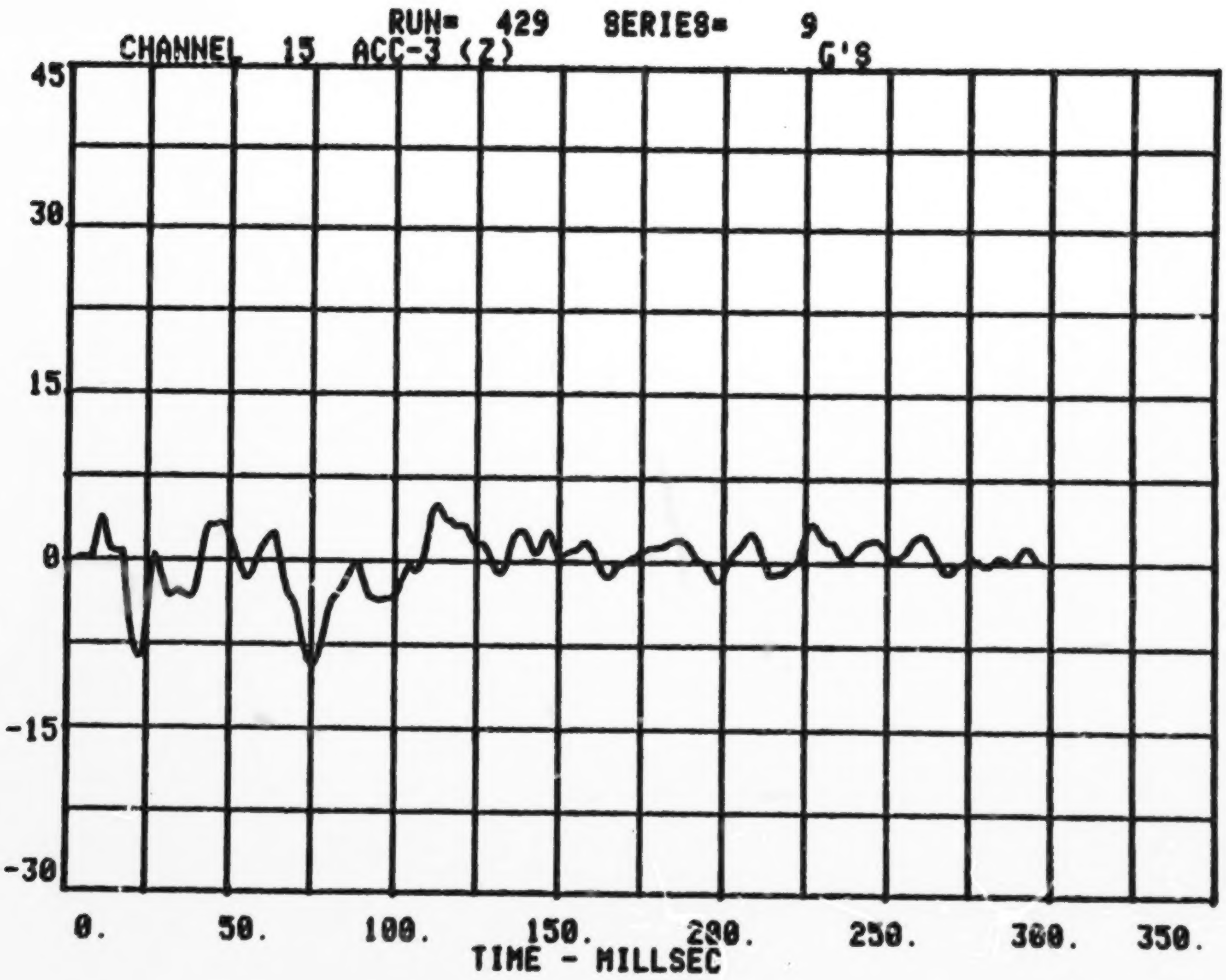

RUN= 429 SERIES= 9
CHANNEL 11 DISPLACEMENT ACCELEROMETER #3 INCHES
32
24
16
8
0
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

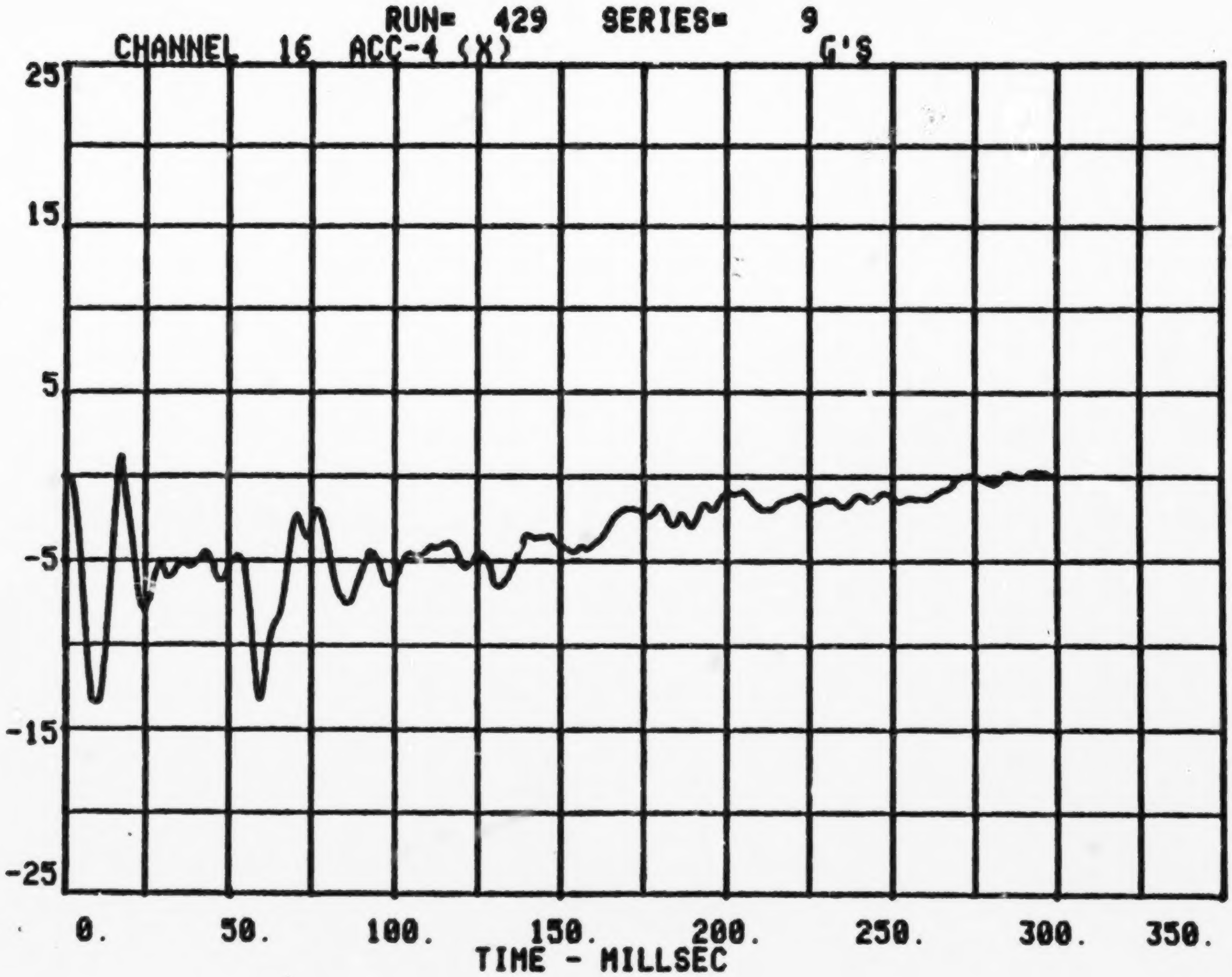

RUN= 429 SERIES= 9
CHANNEL 14 ACC-3 (Y)
G'S
24
16
8
0
-8
-16
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

610


RUN= 429 SERIES= 9
CHANNEL 15 ACC-3 (Z)
G'S
45
30
15
0
-15
-30
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

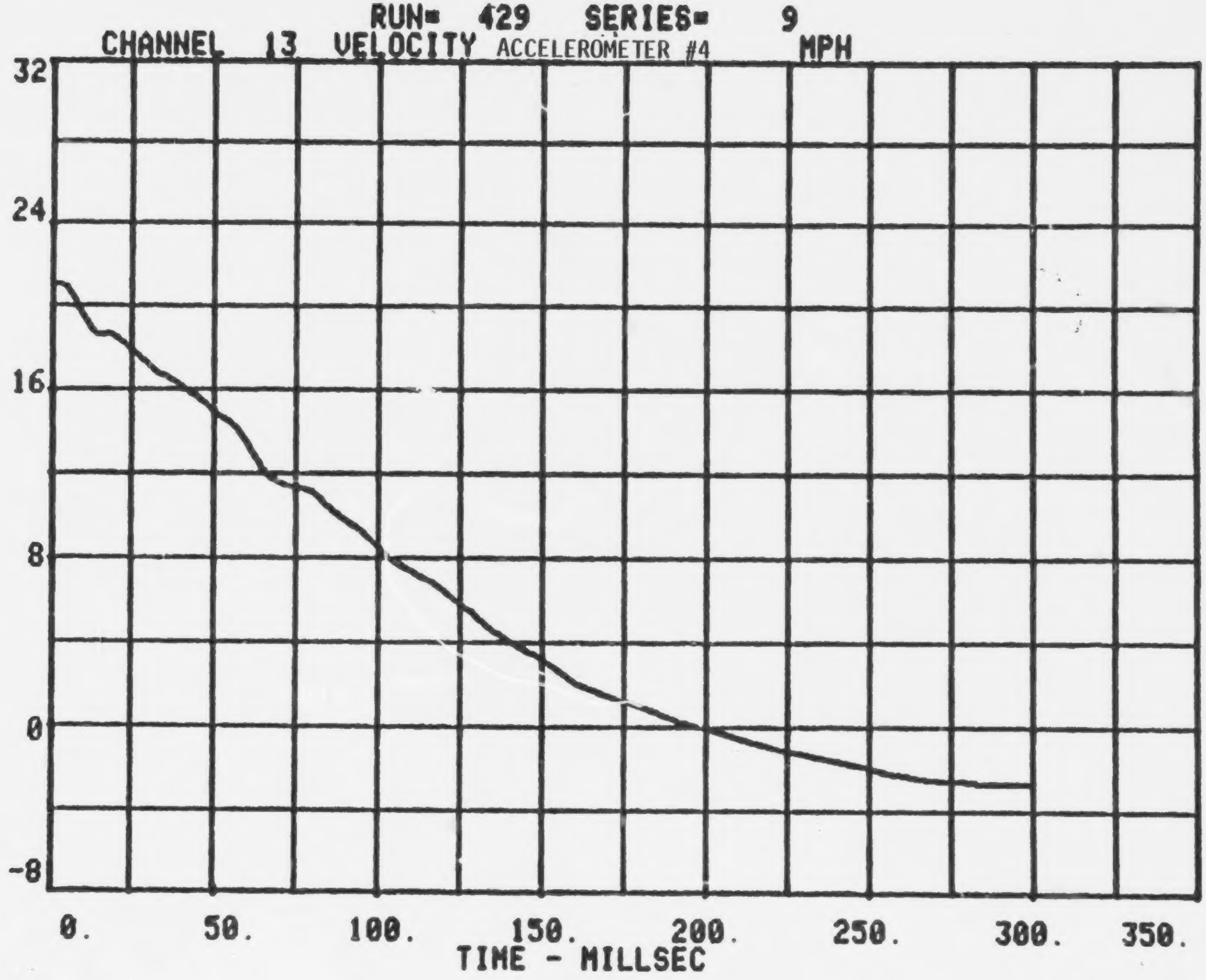
6440-V-5


RUN= 429 SERIES= 9
CHANNEL 16 ACC-4 (X) G'S
25
15
5
-5
-15
-25
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

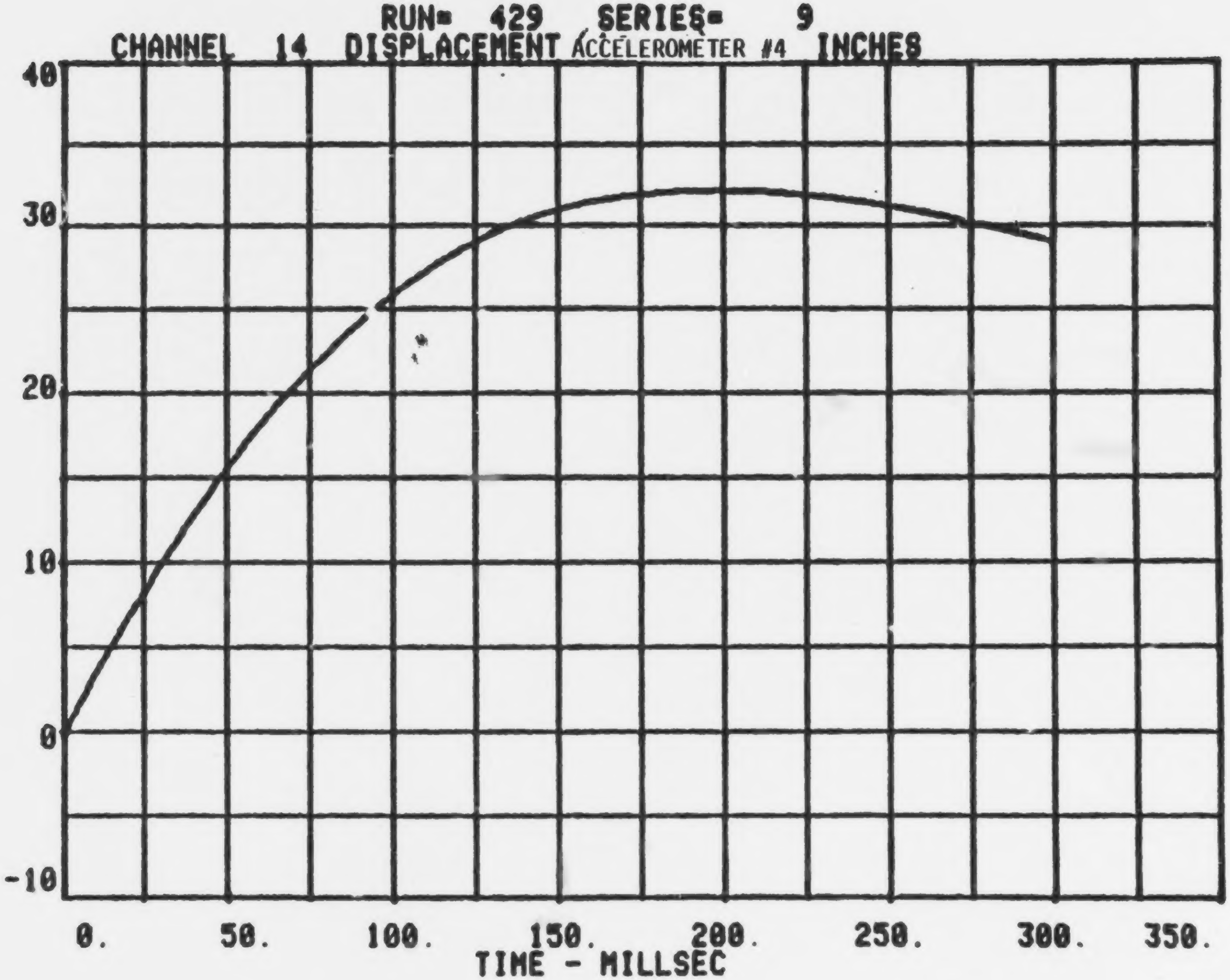
6440-V-5

G11

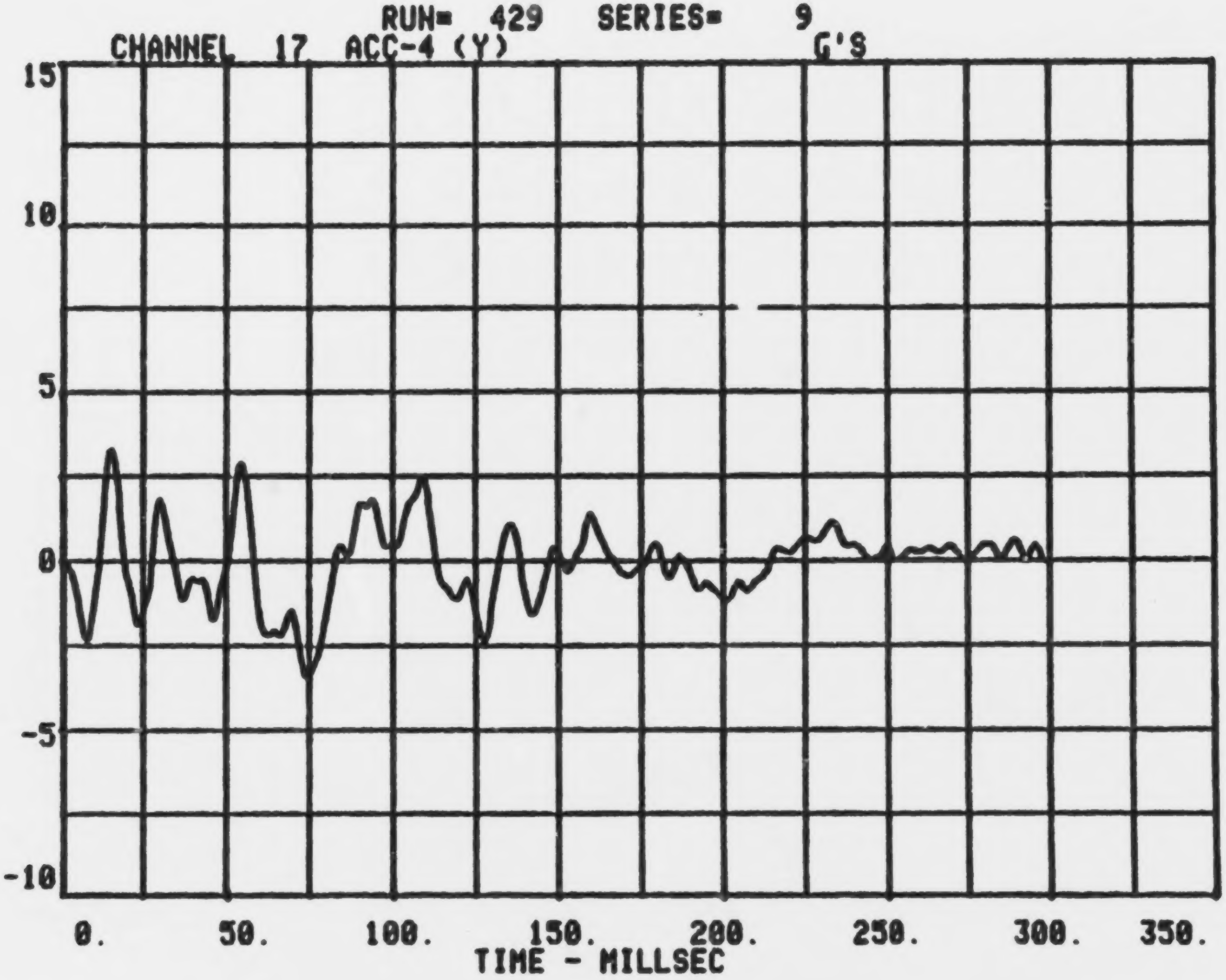
612


RUN= 429 SERIES= 9
CHANNEL 13 VELOCITY ACCELEROMETER #4 MPH
32
24
16
8
0
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

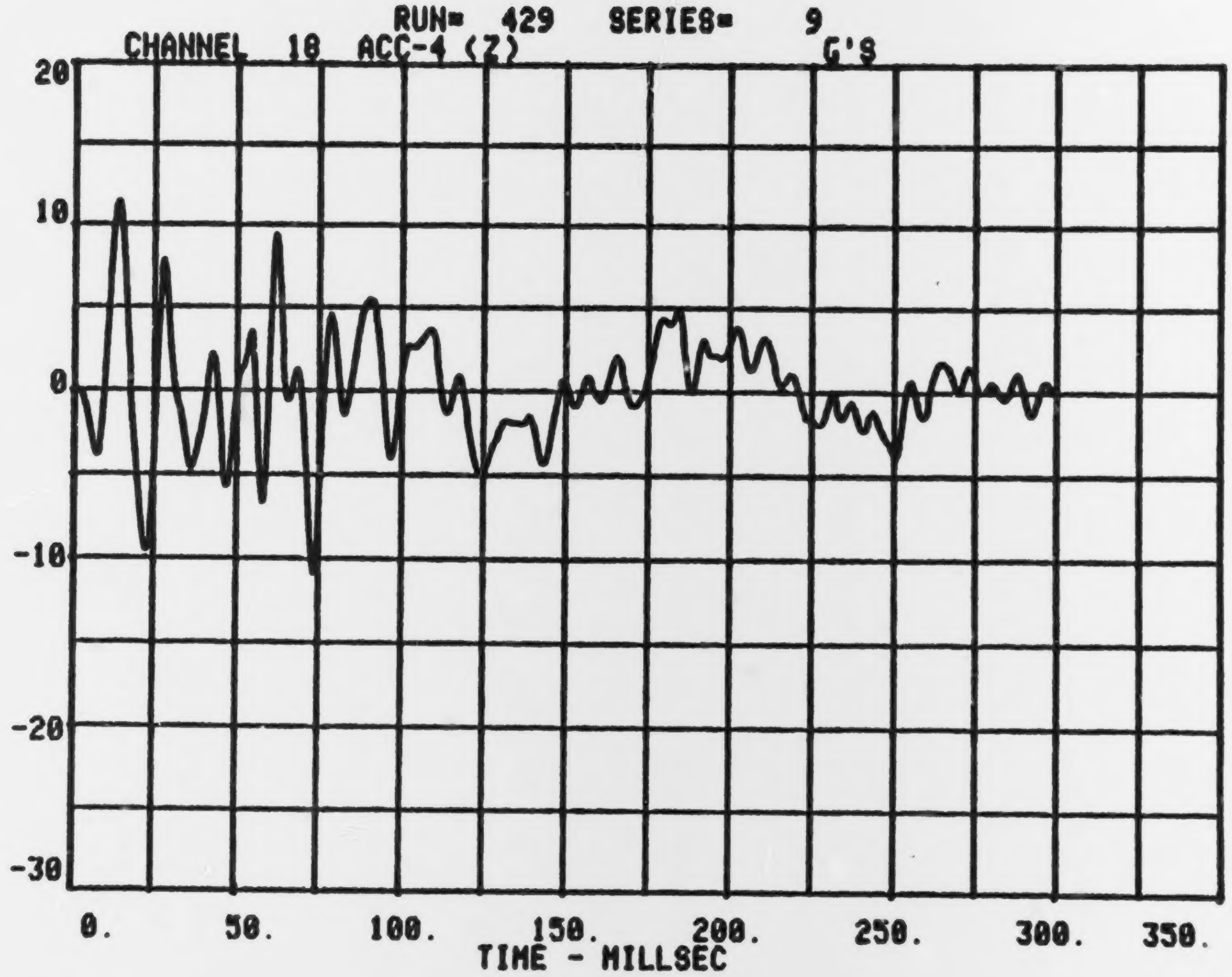

RUN= 429 SERIES= 9
CHANNEL 14 DISPLACEMENT ACCELEROMETER #4 INCHES
40
30
20
10
0
-10
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5



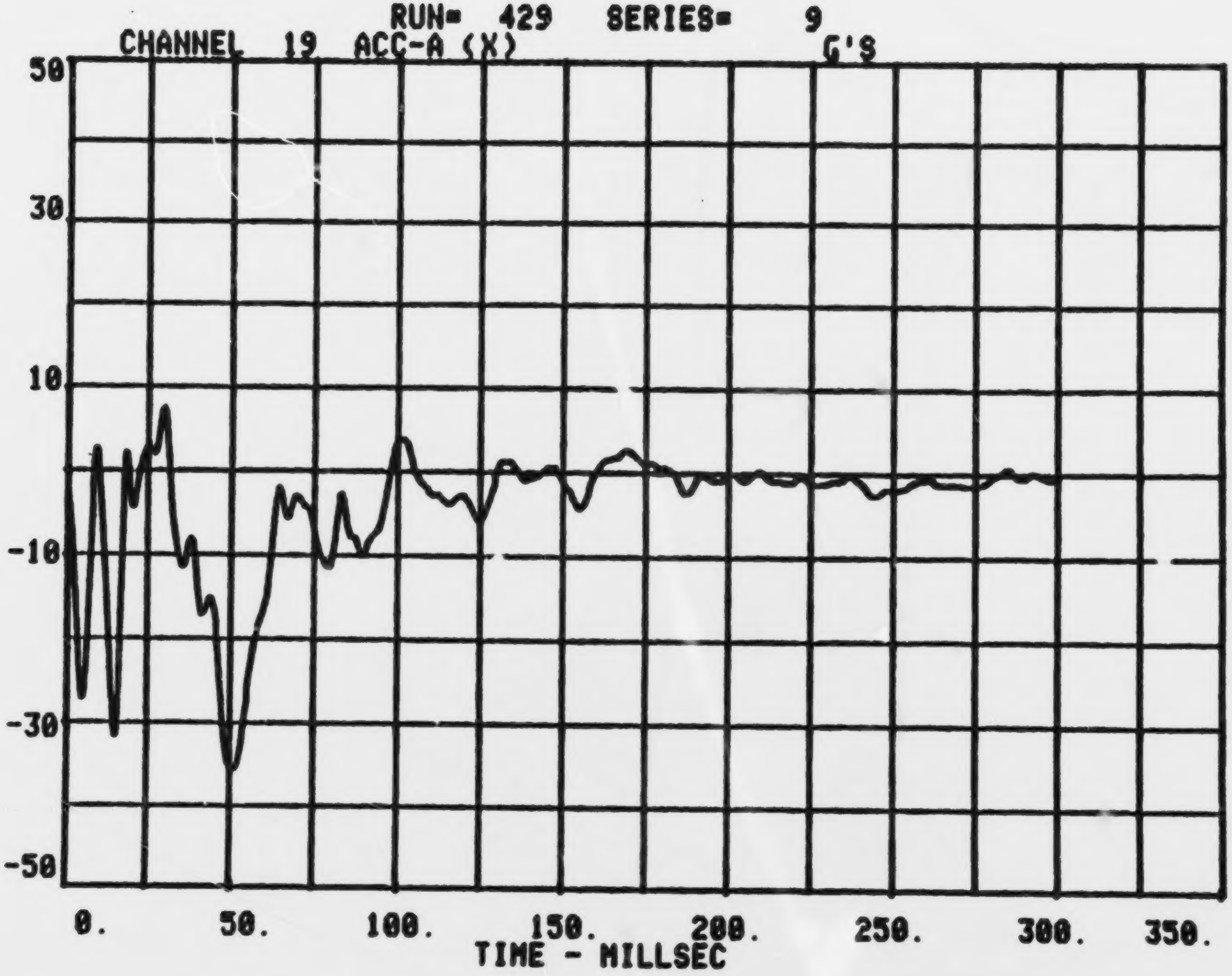
RUN= 429 SERIES= 9

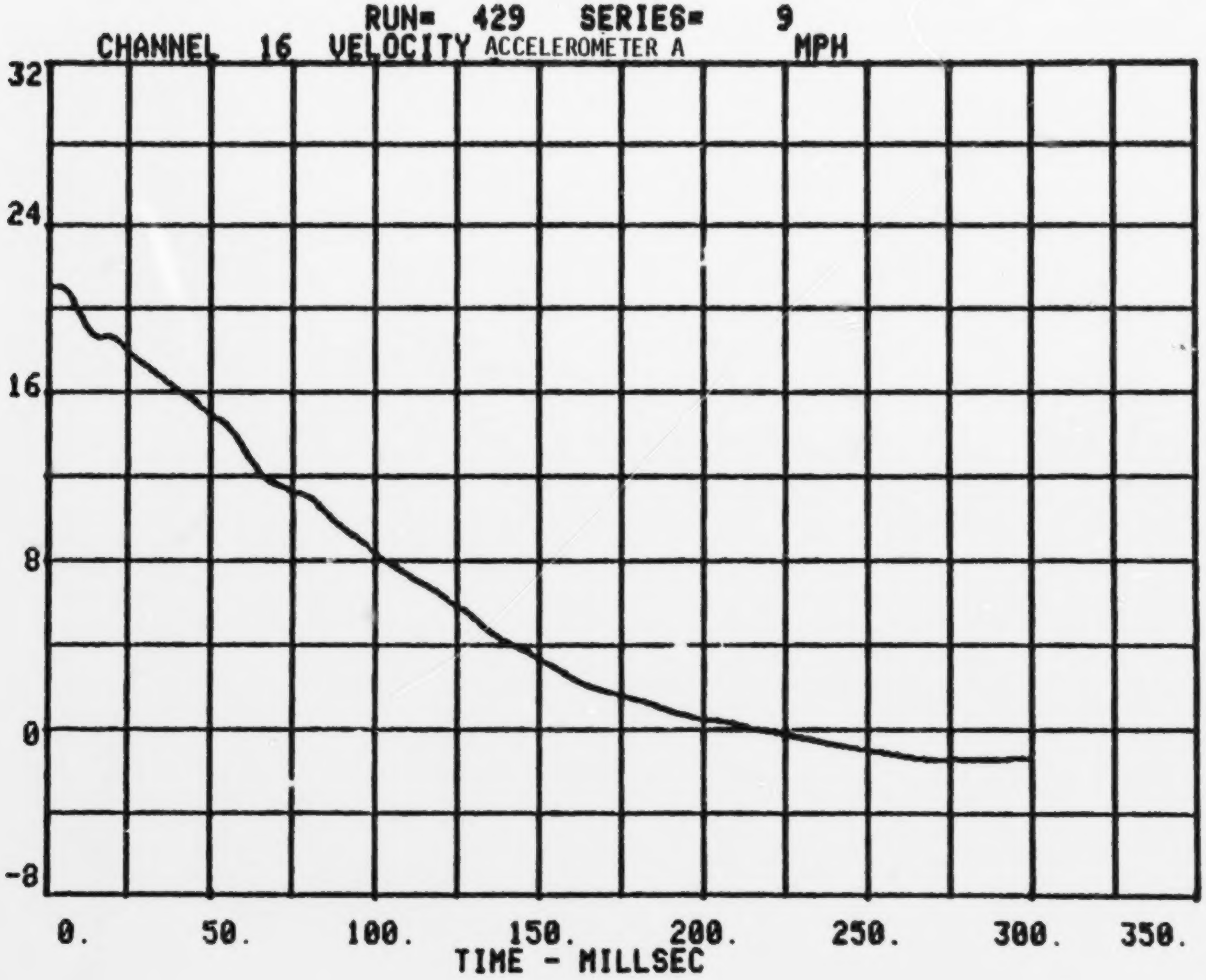
CHANNEL 17 ACC-4 (Y) G'S


RUN= 429 SERIES= 9
CHANNEL 18 ACC-4 (Z) G'S
20
10
0
-10
-20
-30
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

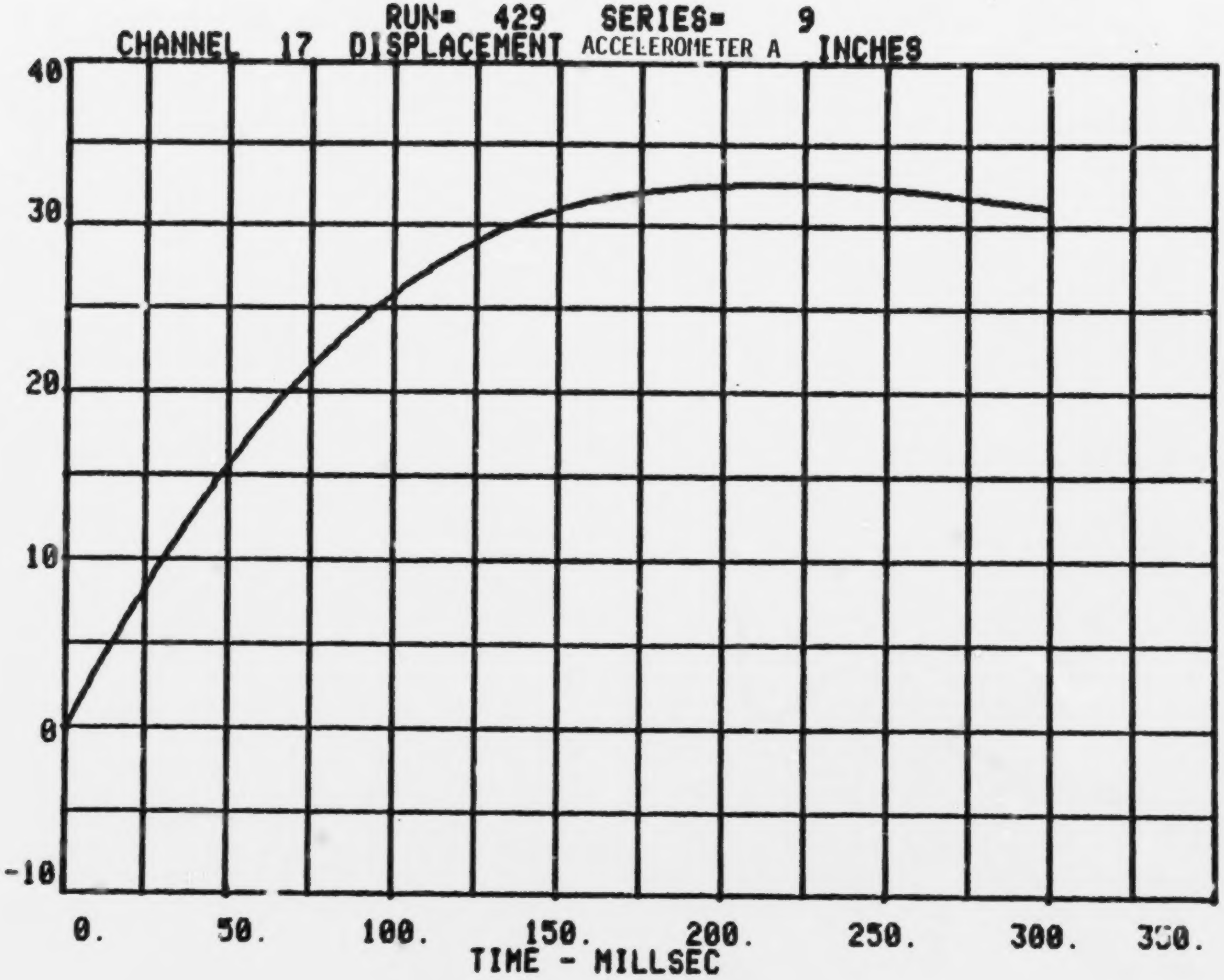
615


RUN= 429 SERIES= 9
CHANNEL 19 ACC-A (X)
G'S
50
30
10
-10
-30
-50
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC


RUN= 429 SERIES= 9
CHANNEL 16 VELOCITY ACCELEROMETER A MPH
32
24
16
8
0
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

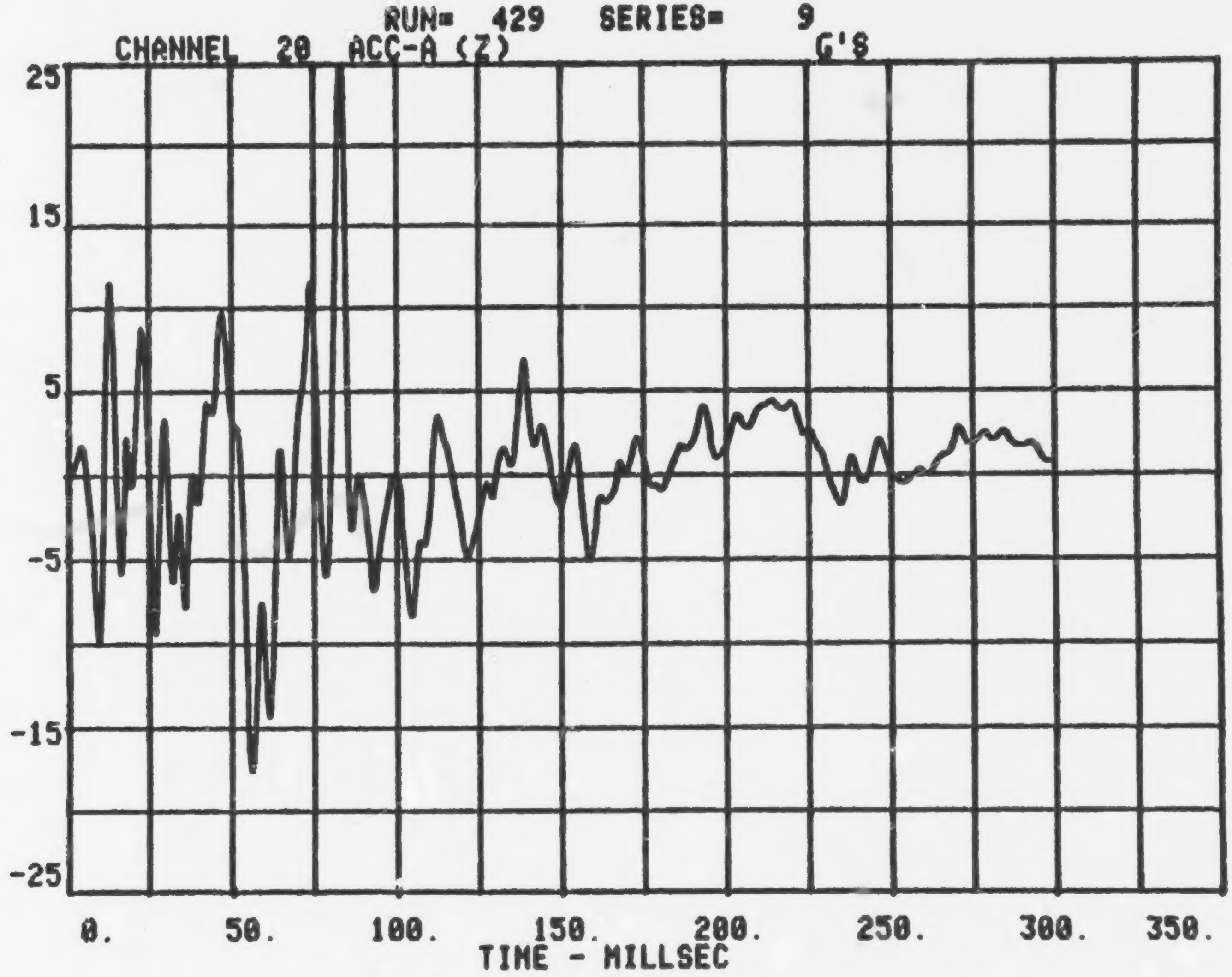
6440-V-5

618



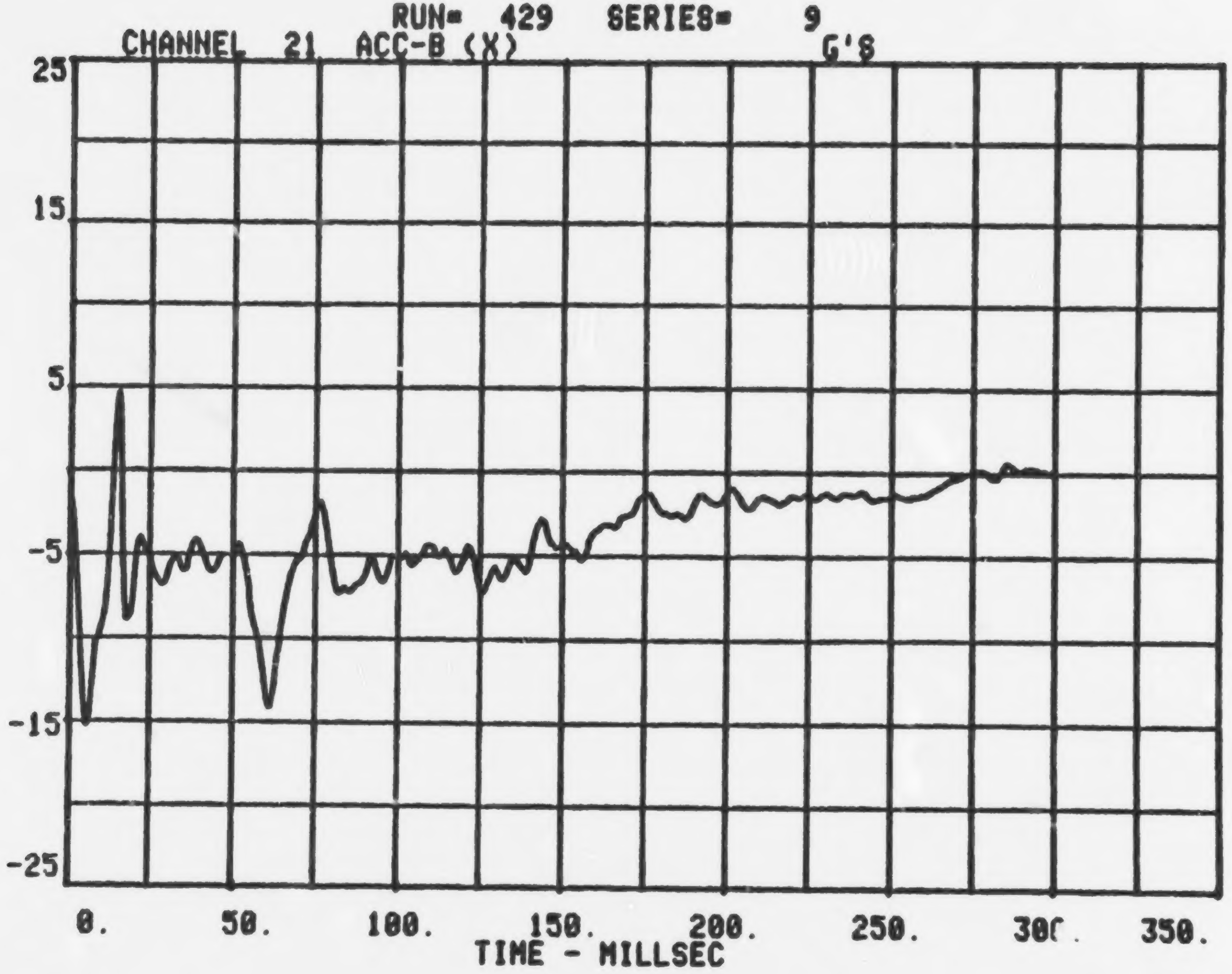
RUN= 429 SERIES= 9
CHANNEL 17 DISPLACEMENT ACCELEROMETER A INCHES
40
30
20
10
0
-10
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5


RUN= 429 SERIES= 9
CHANNEL 20 ACC-A (Z) G'S
25
15
5
-5
-15
-25
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

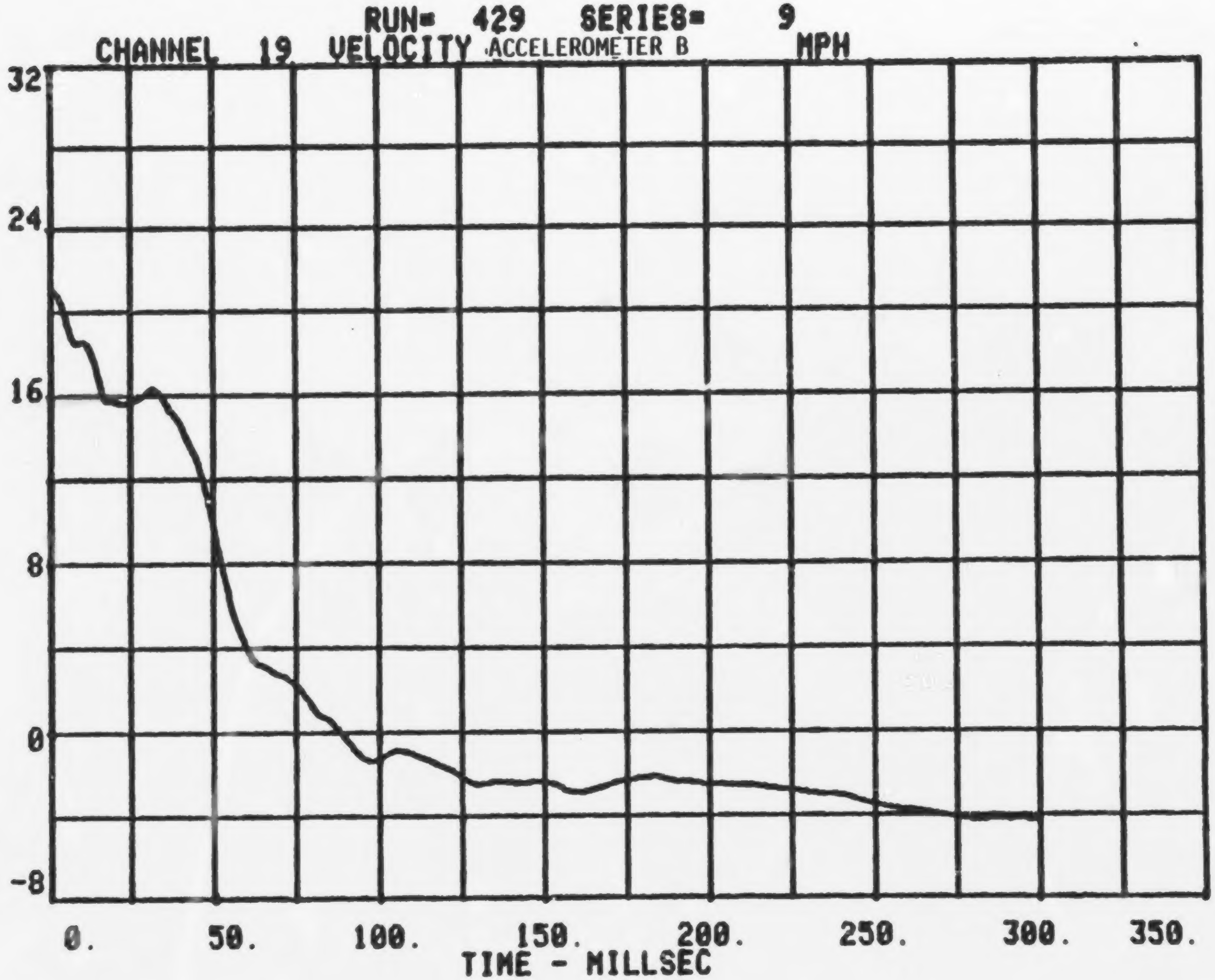
6440-V-5

620



RUN= 429 SERIES= 9
CHANNEL 21 ACC-B (X)
G'S
25
15
5
-5
-15
-25
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5



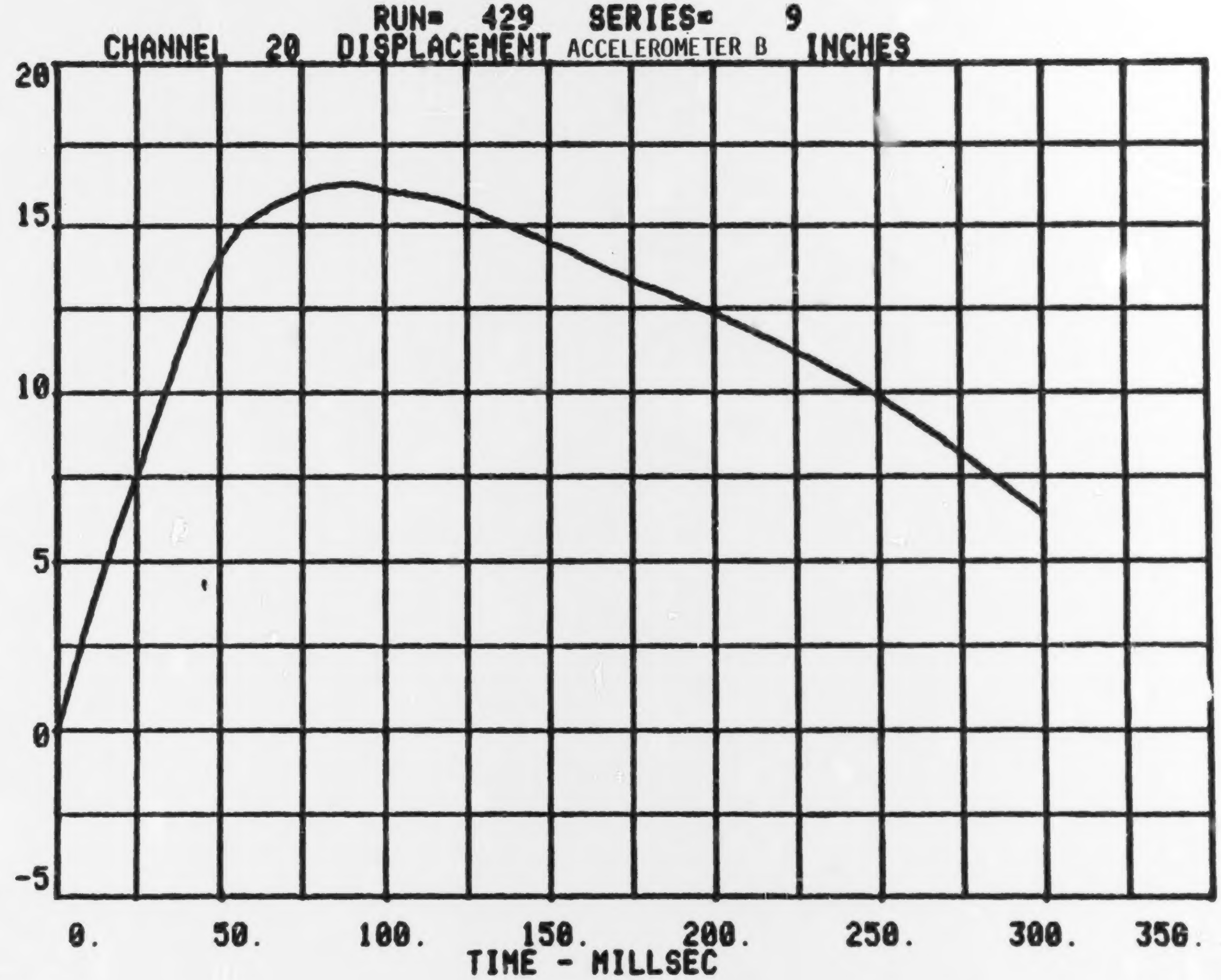
RUN= 429 SERIES= 9

CHANNEL 19 VELOCITY ACCELEROMETER B MPH

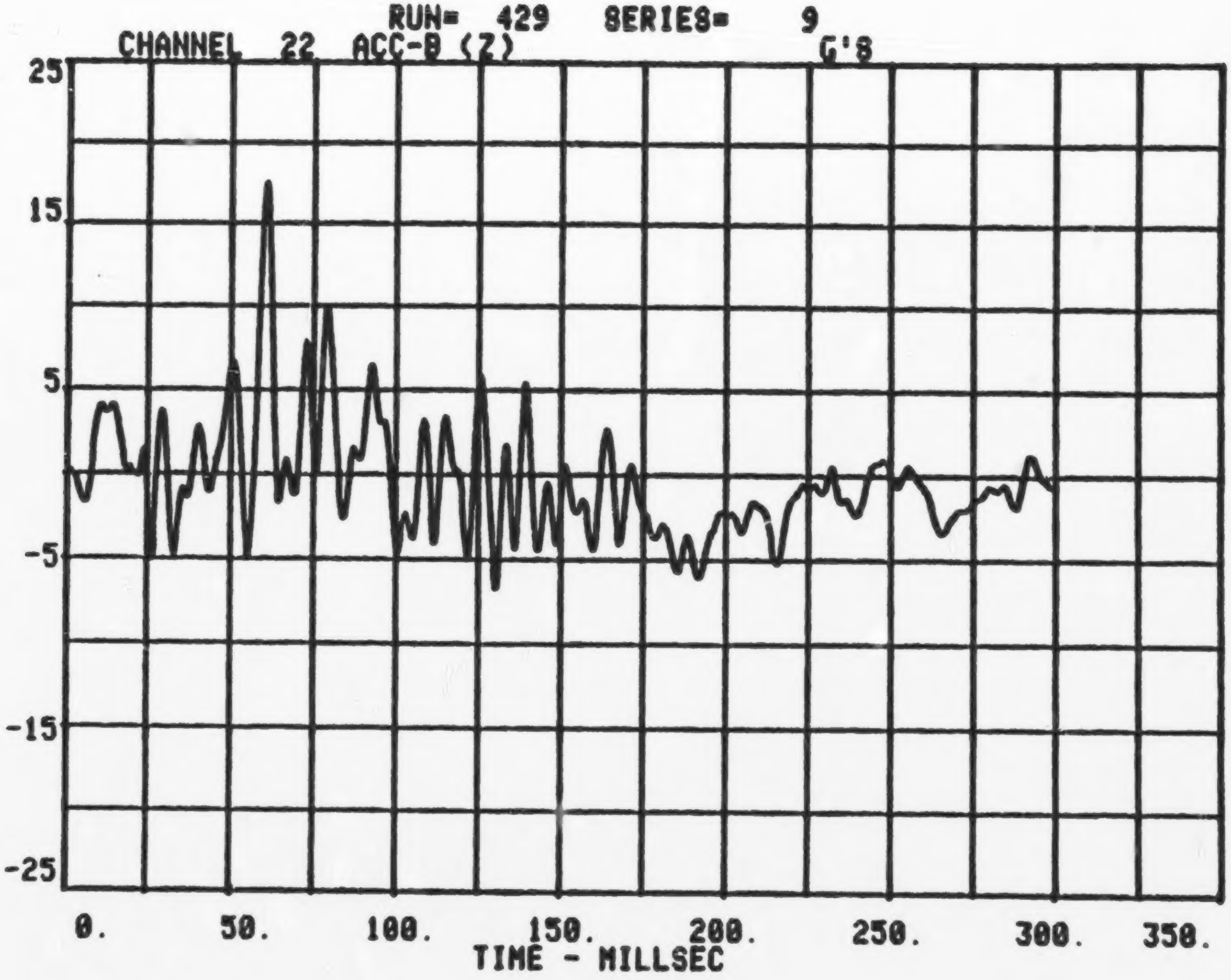
6440-V-5

621

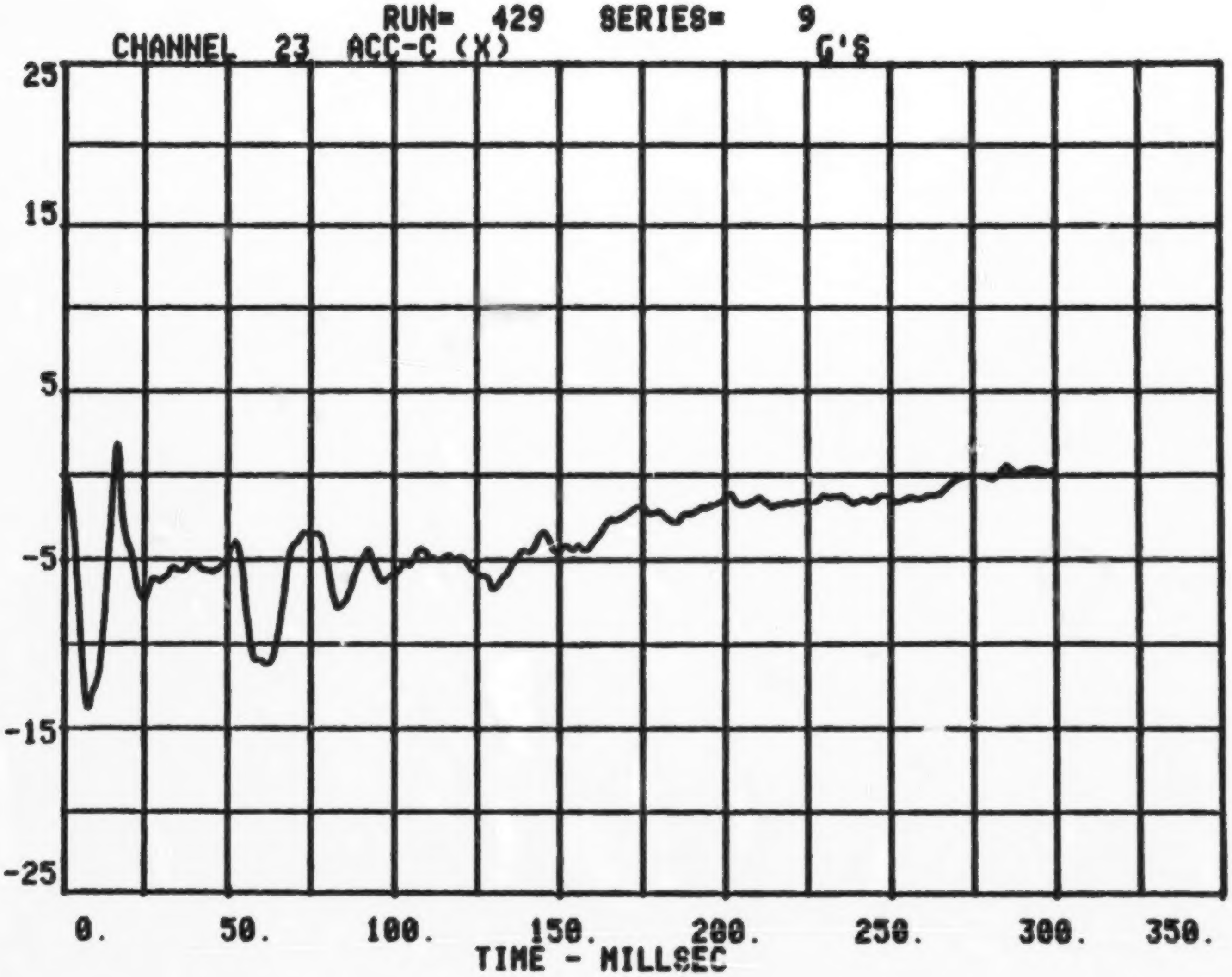
622


RUN= 429 SERIES= 9
CHANNEL 20 DISPLACEMENT ACCELEROMETER B INCHES
20
15.
10.
5
0
-5
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

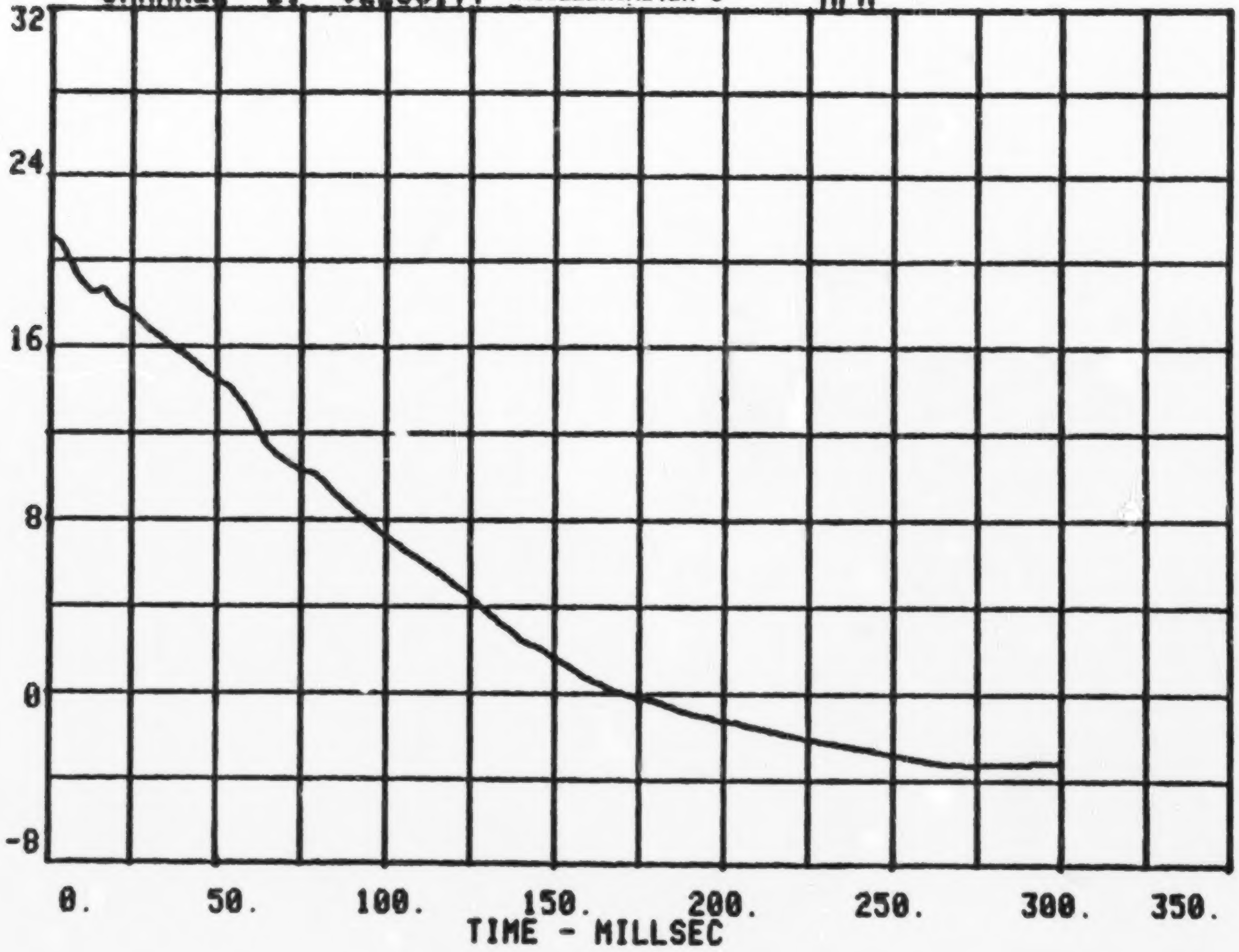
6440-V-5


RUN= 429 SERIES= 9
CHANNEL 22 ACC-B (Z)
G'S
25
15
5
-5
-15
-25
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5


RUN= 429 SERIES= 9
CHANNEL 23 ACC-C (X)
G'S
25
15
5
-5
-15
-25
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5



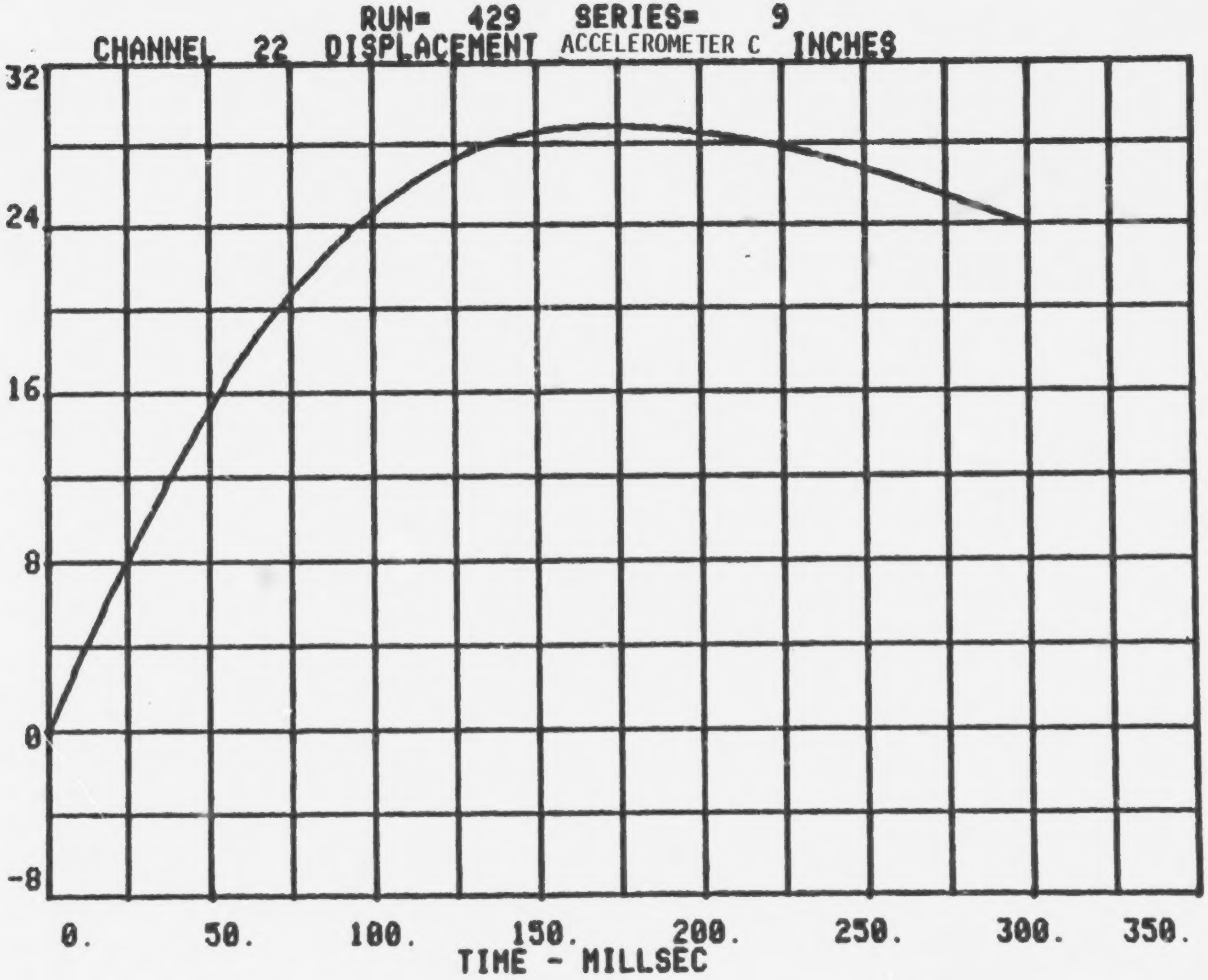
RUN= 429 SERIES= 9

CHANNEL 21 VELOCITY ACCELEROMETER C MPH

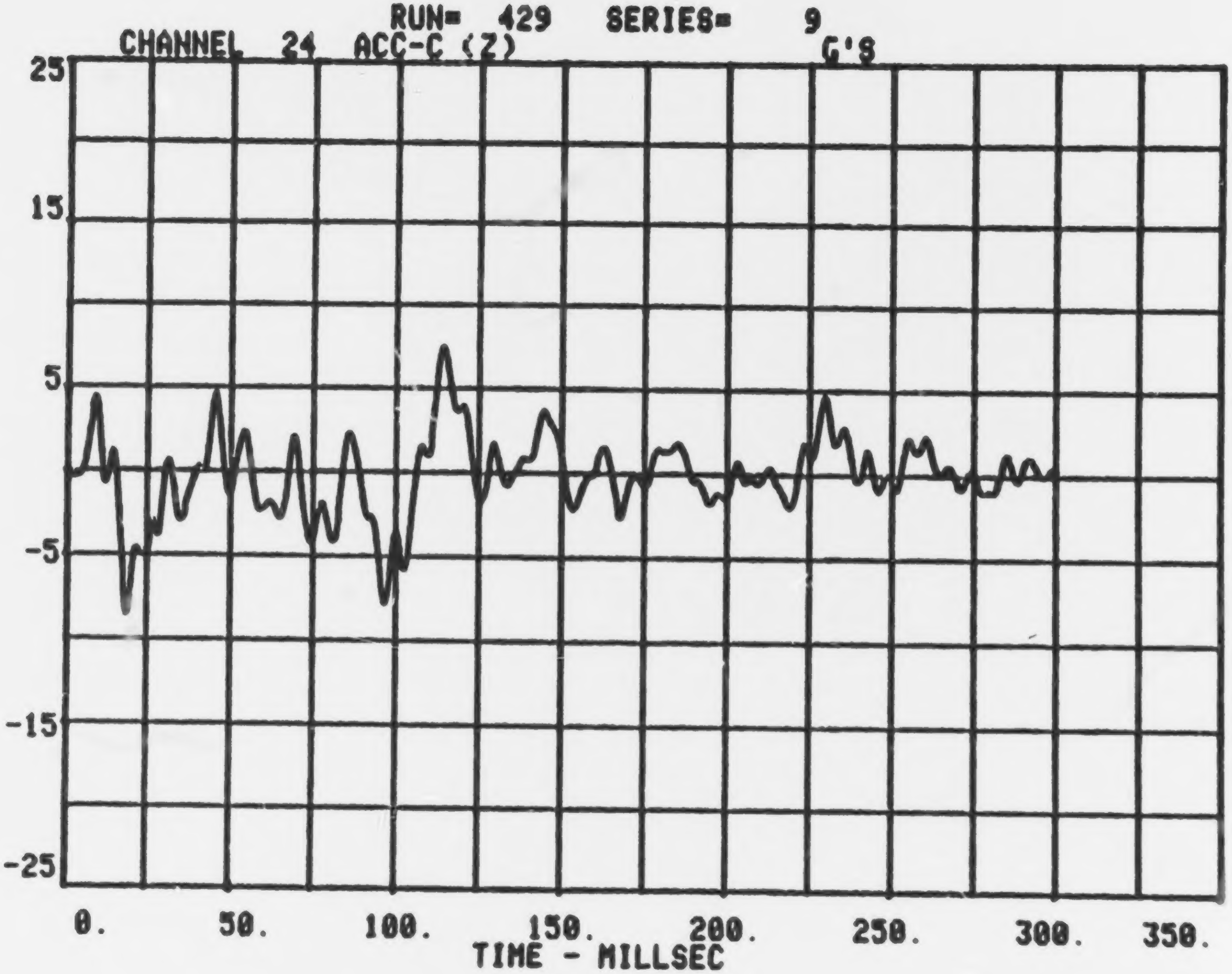
6440-V-5

625

626


RUN= 429 SERIES= 9
CHANNEL 22 DISPLACEMENT ACCELEROMETER C INCHES
32
24
16
8
0
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

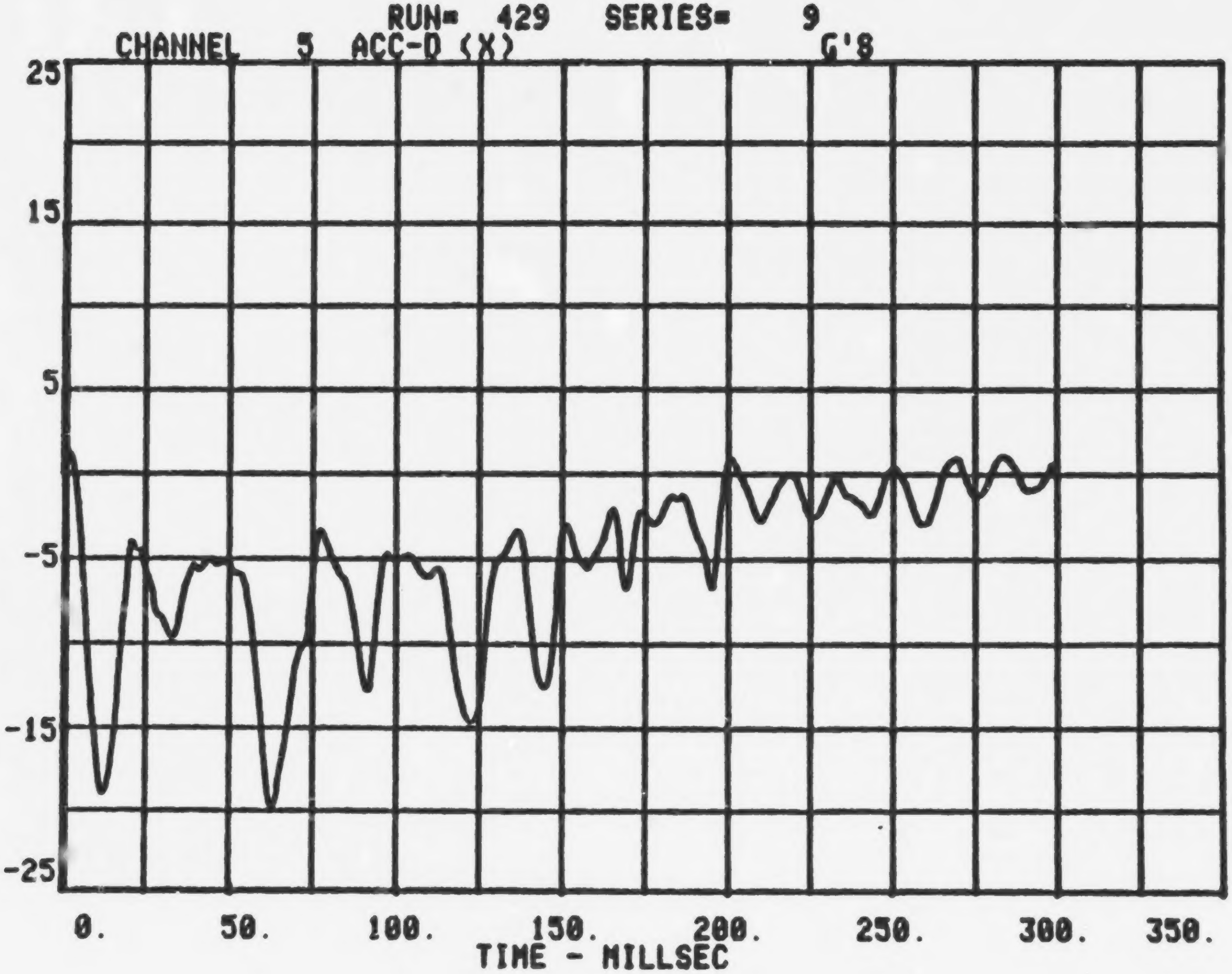
6440-V-5


RUN= 429 SERIES= 9
CHANNEL 24 ACC-C (Z)
G'S
25
15
5
-5
-15
-25
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

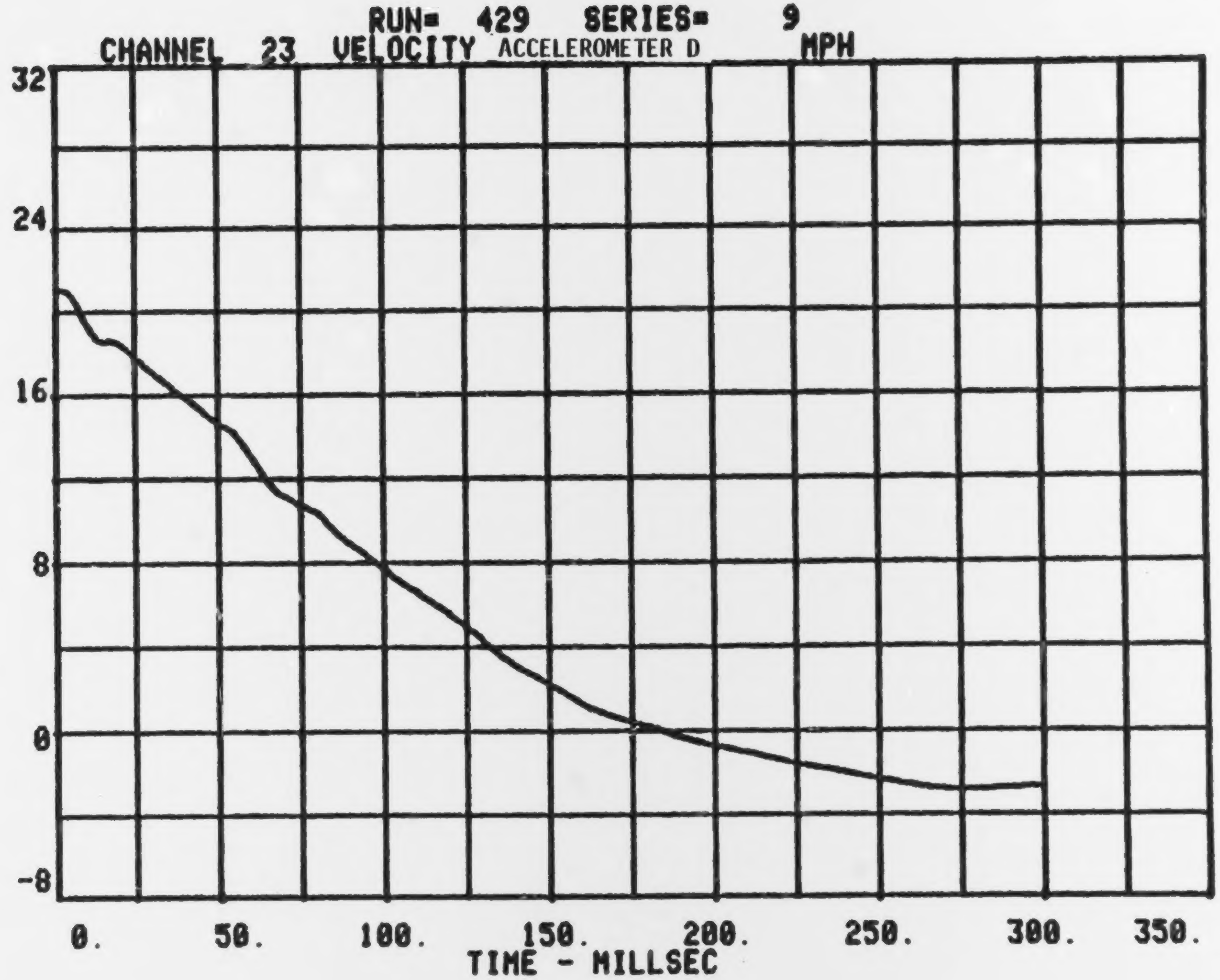
627

628



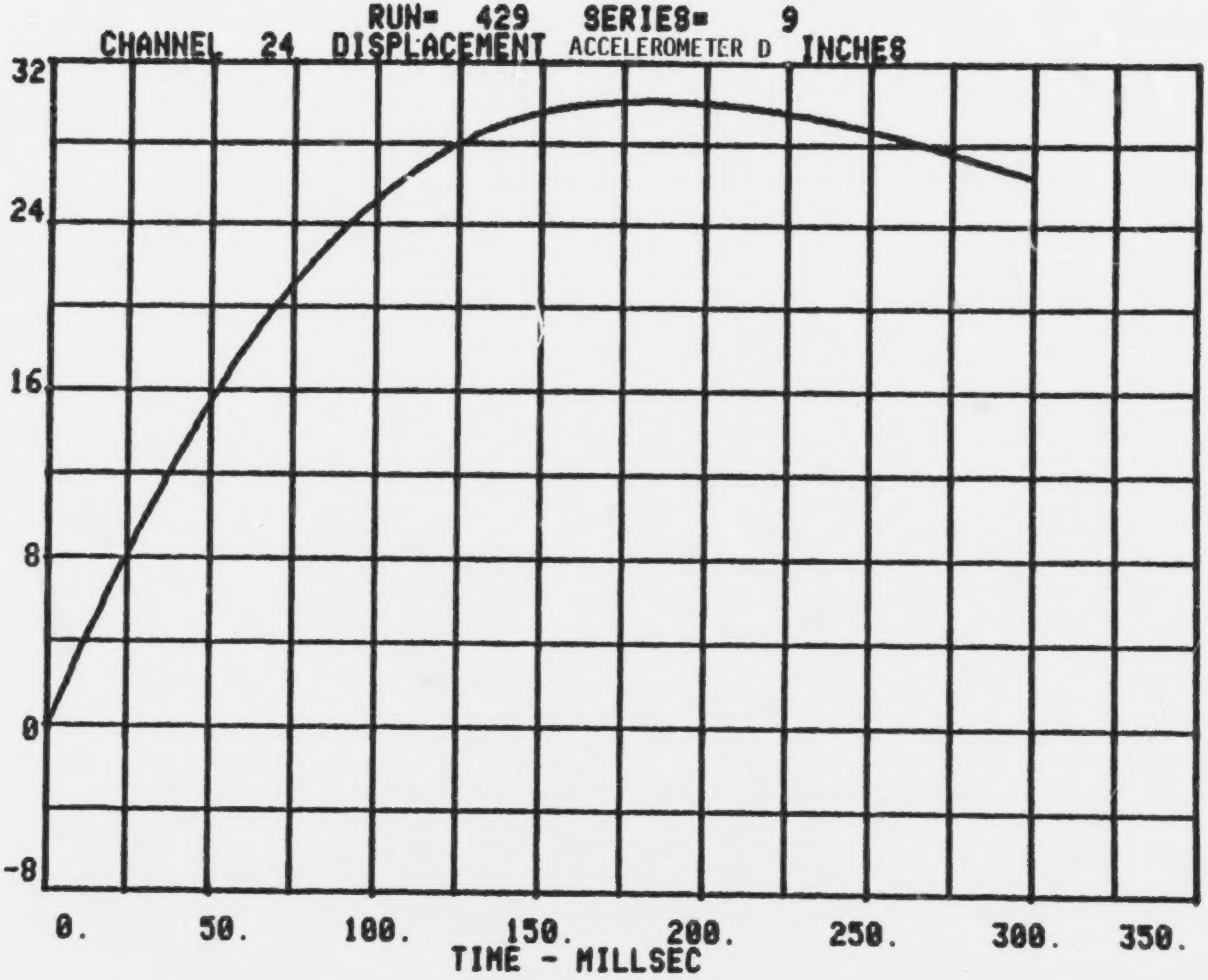
RUN= 429 SERIES= 9
CHANNEL 5 ACC-D (X) G'S
25
15
5
-5
-15
-25
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

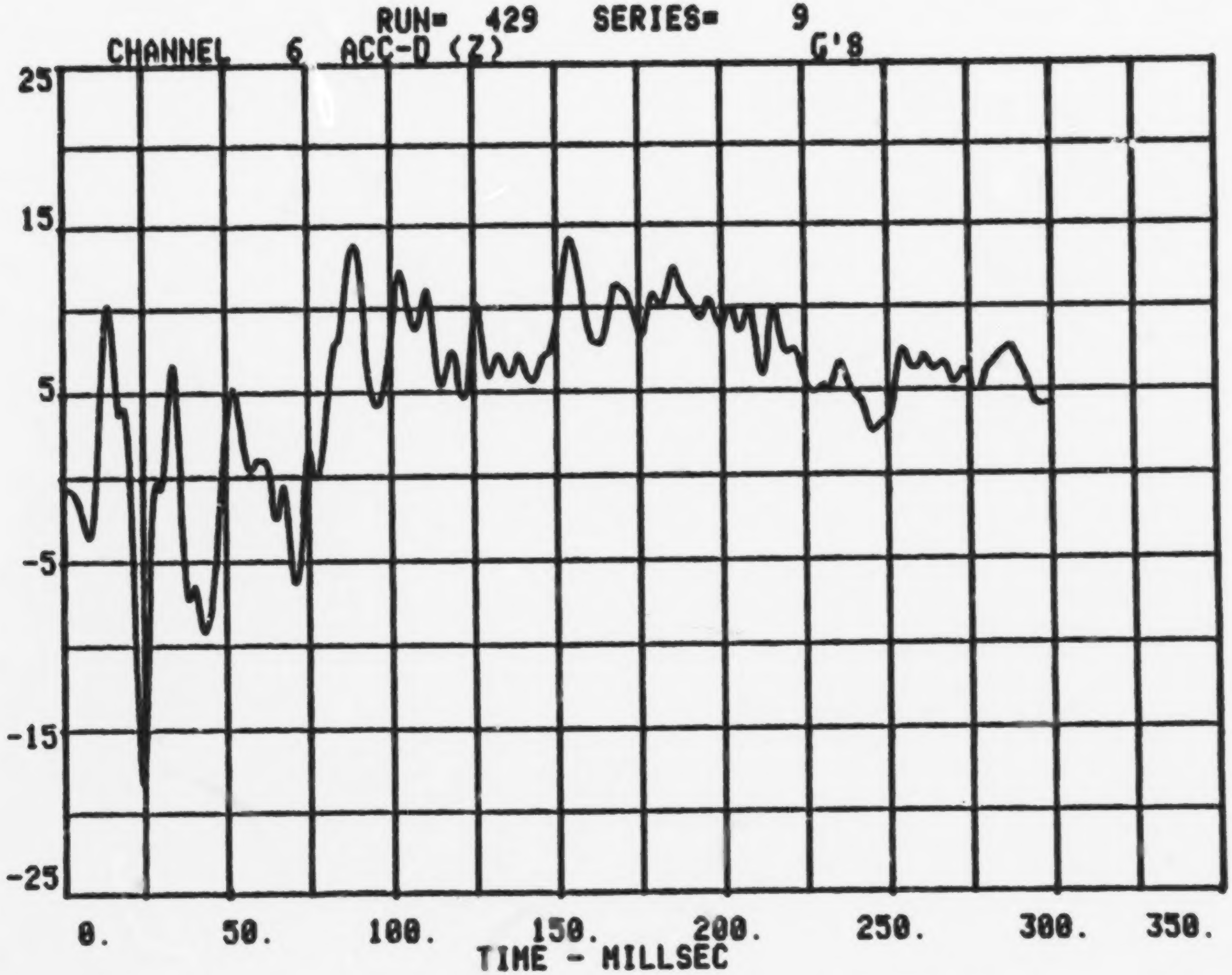

RUN= 429 SERIES= 9
CHANNEL 23 VELOCITY ACCELEROMETER D MPH
32
24
16
8
0
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

630


RUN= 429 SERIES= 9
CHANNEL 24 DISPLACEMENT ACCELEROMETER D INCHES
32
24
16
8
0
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

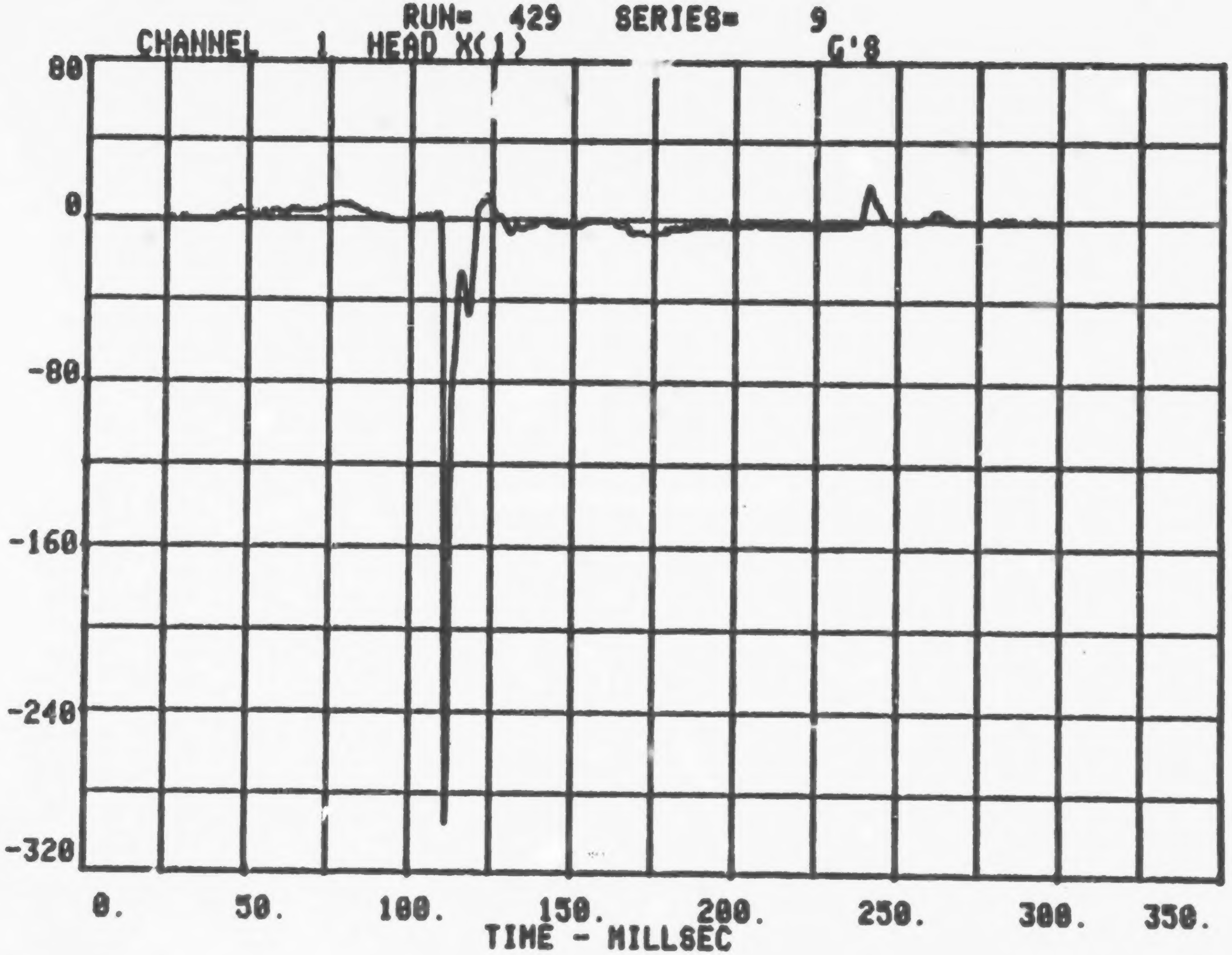

RUN= 429 SERIES= 9
CHANNEL 6 ACC-D (Z)
G'S
25
15
5
-5
-15
-25
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

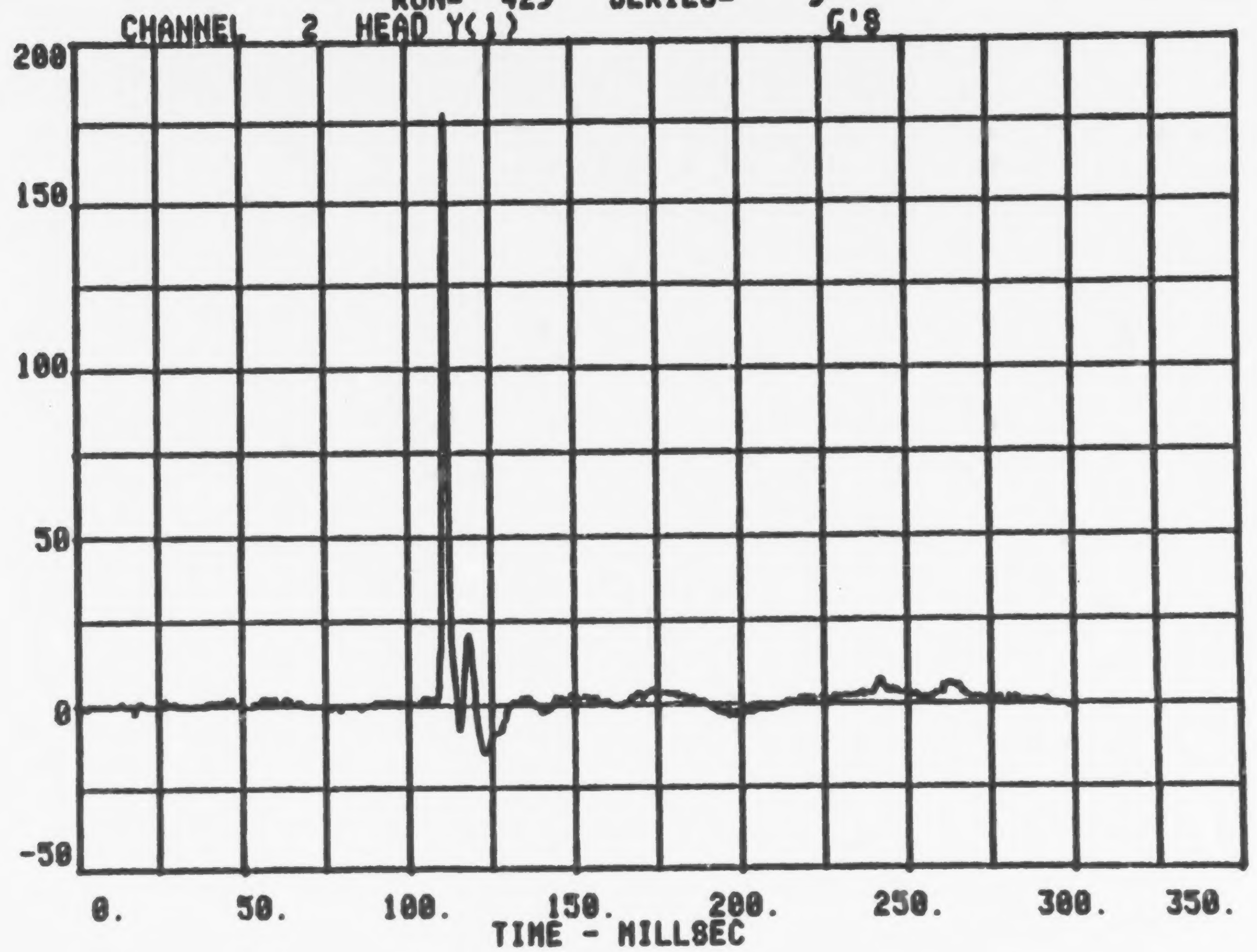
BLANK PAGE

APPENDIX 2

DUMMY DATA

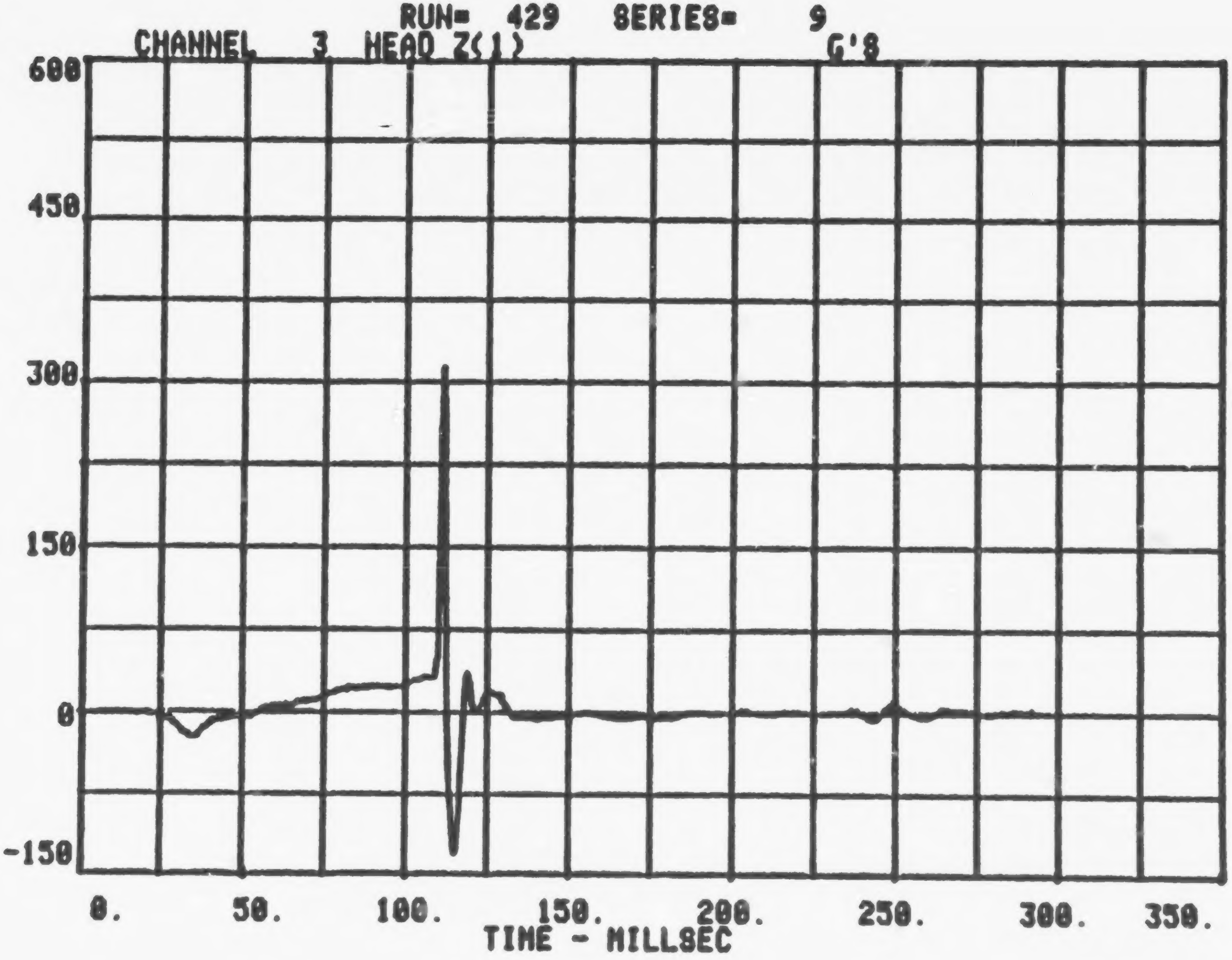

RUN= 429 SERIES= 9
CHANNEL 1 HEAD X(1)
G'S
80
0
-80
-160
-240
-320
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

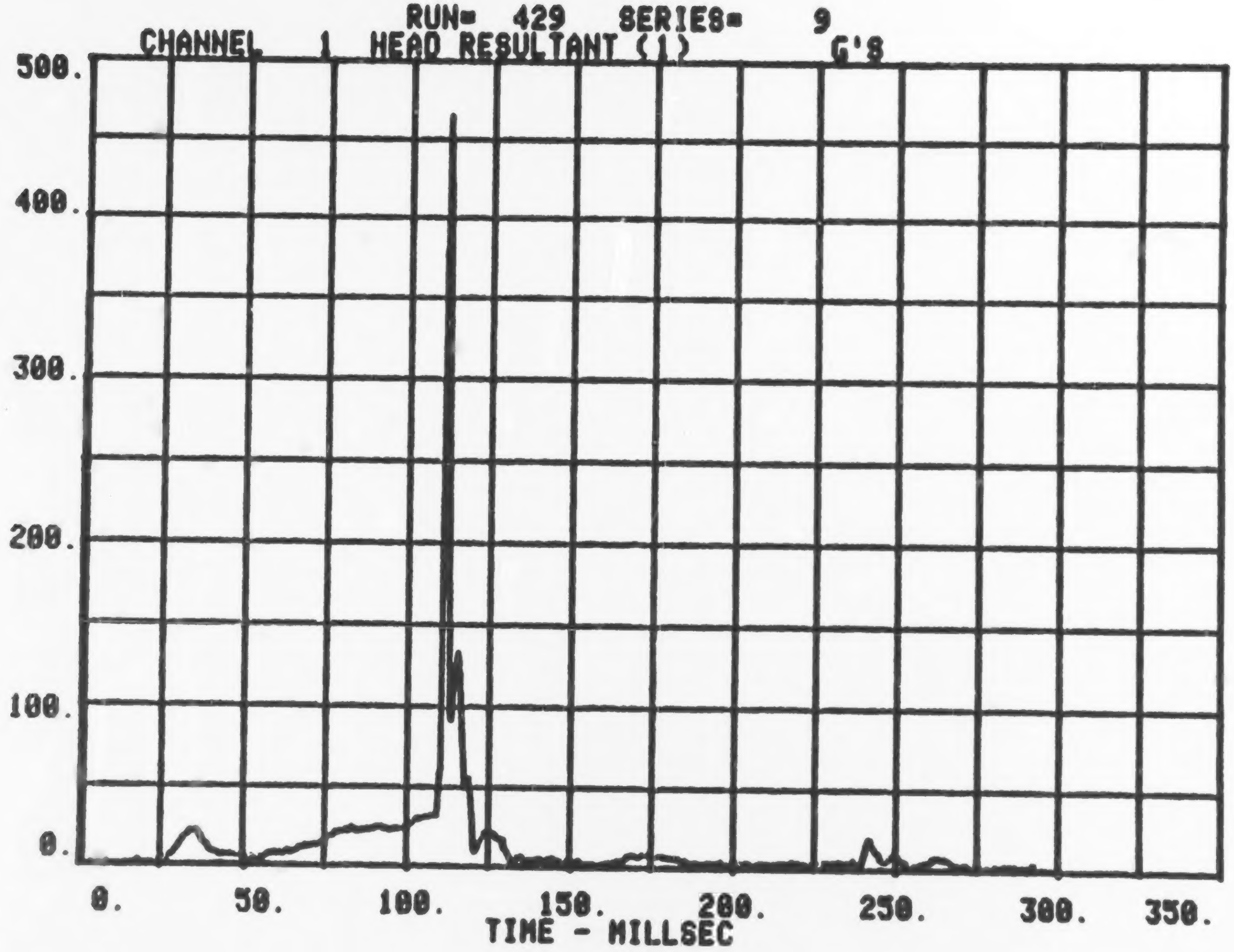

RUN= 429 SERIES= 9
CHANNEL 2 HEAD Y(1)
G'S
200
150
100
50
0
-50
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

636


RUN= 429 SERIES= 9
CHANNEL 3 HEAD Z(1)
G'S
600
450
300
150
0
-150
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5



RUN= 429 SERIES= 9
CHANNEL 1 HEAD RESULTANT (1) G'S
500.
400.
300.
200.
100.
0.
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

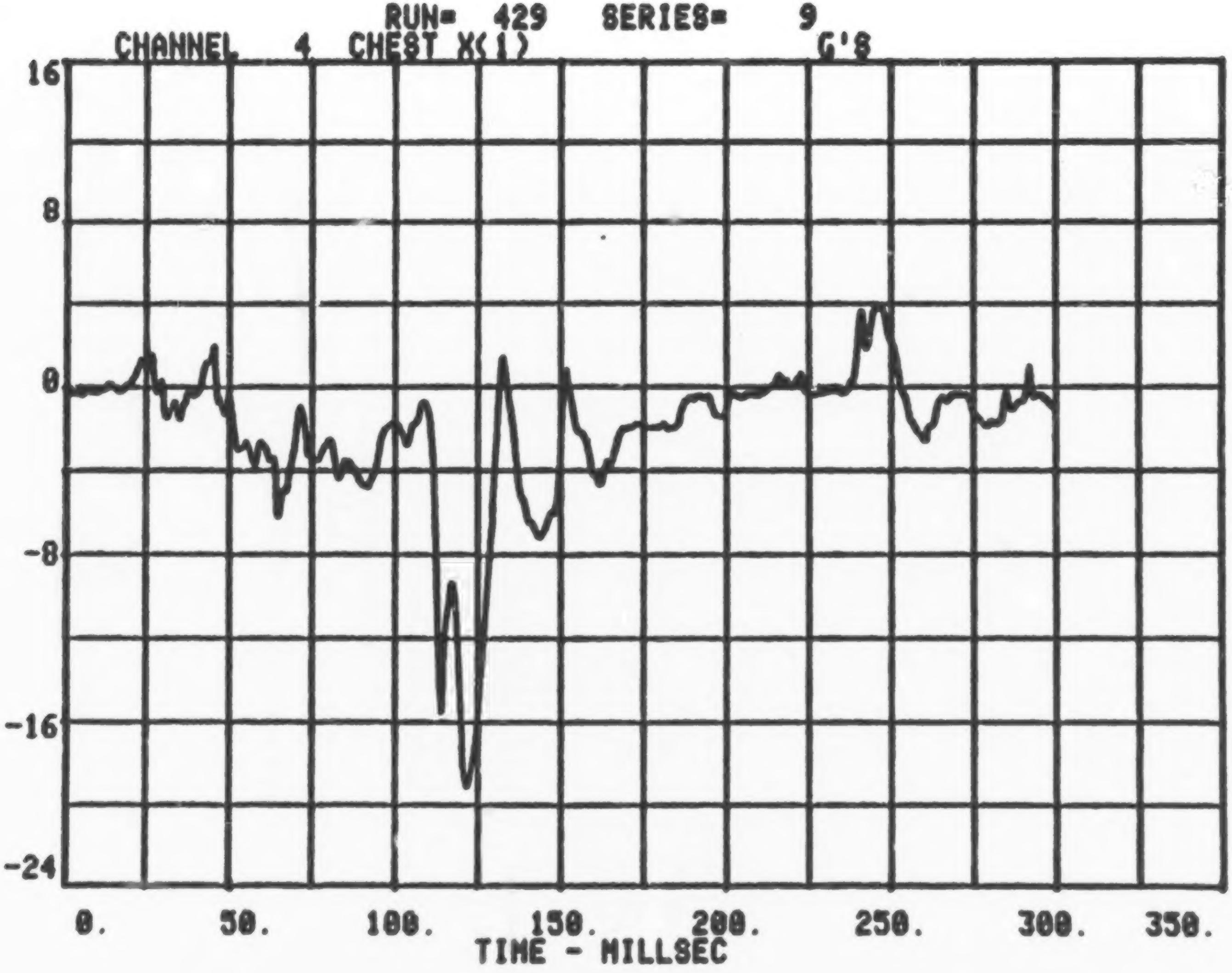
6440-ℹ-5

637

638

```
HEAD INJURY CRITERION
HEAD SEVERITY INDEX

BUS TEST

RUN= 429

HEAD RESULTANT (1)

HIC=5646.0   FROM T1= .11010   TO T2= .11250

AVERAGE ACCELERATION BETWEEN T1 AND T2= 353.7G'S

EVENT TIME= 300.0  MSEC

SEVERITY INDEX=7000.1
```

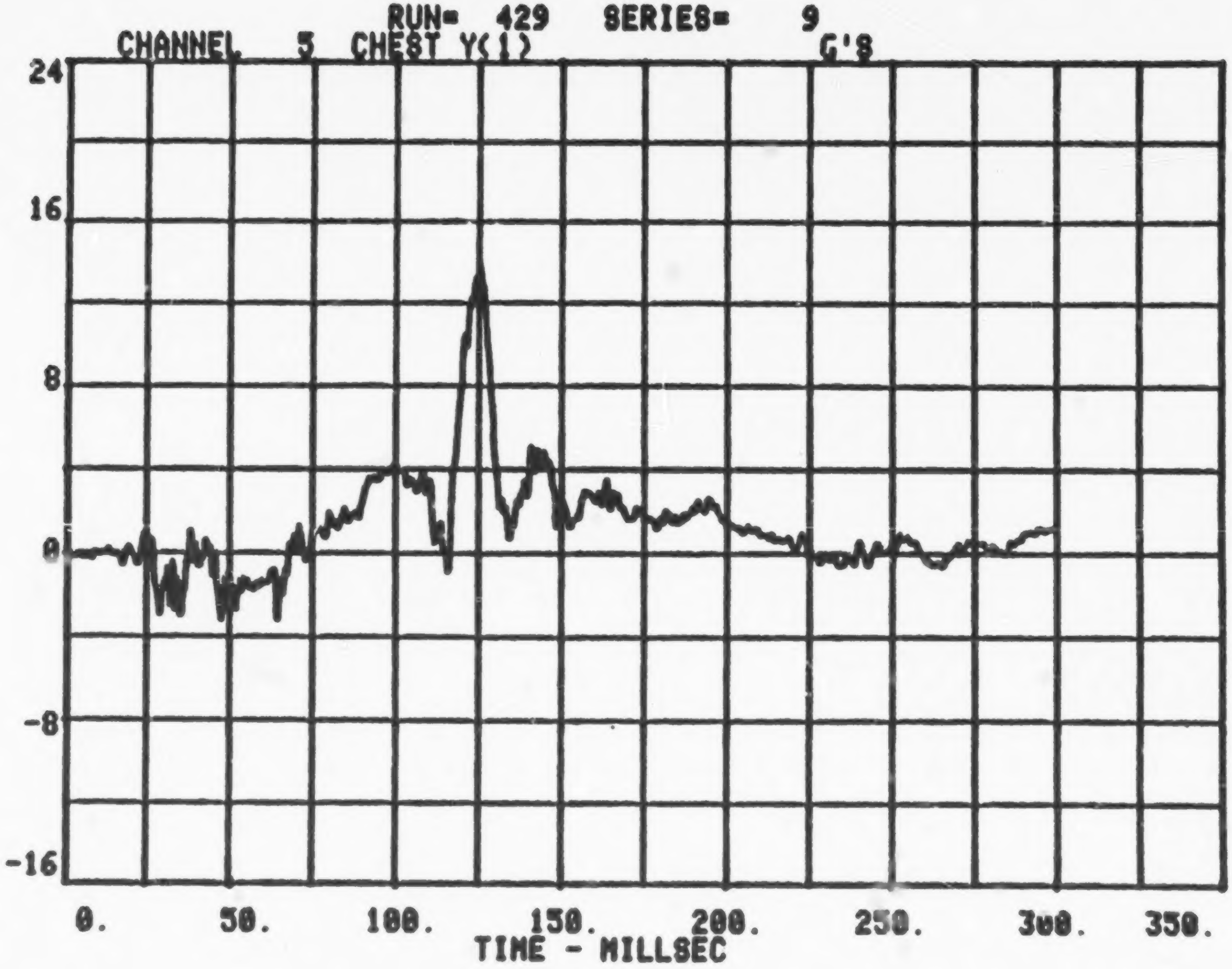
6440-V-5


RUN= 429 SERIES= 9
CHANNEL 4 CHEST X(1) G'S
16
8
0
-8
-16
-24
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

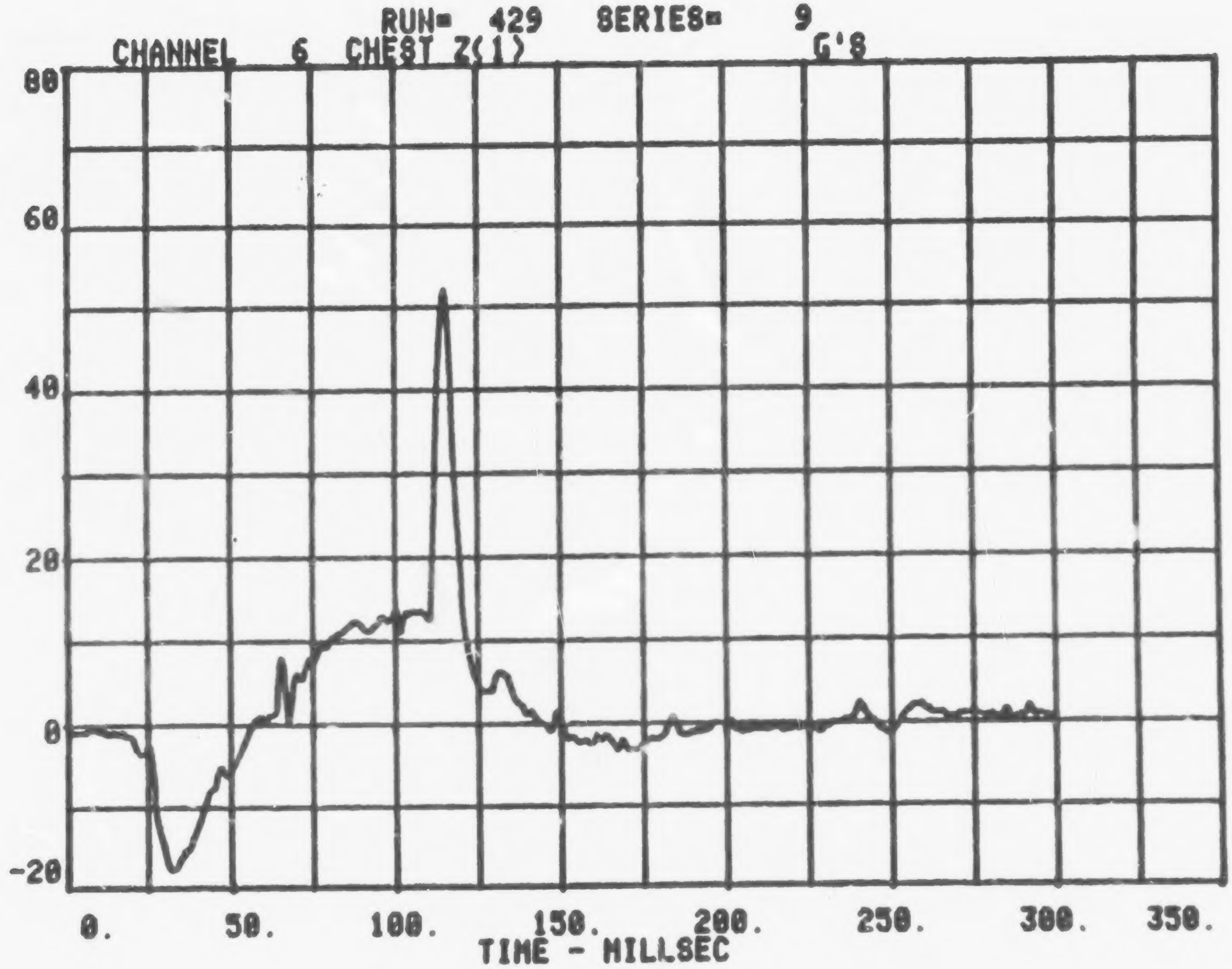
6440-V-5

639

640


RUN= 429 SERIES= 9
CHANNEL 5 CHEST Y(1) G'S
24
16
8
0
-8
-16
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

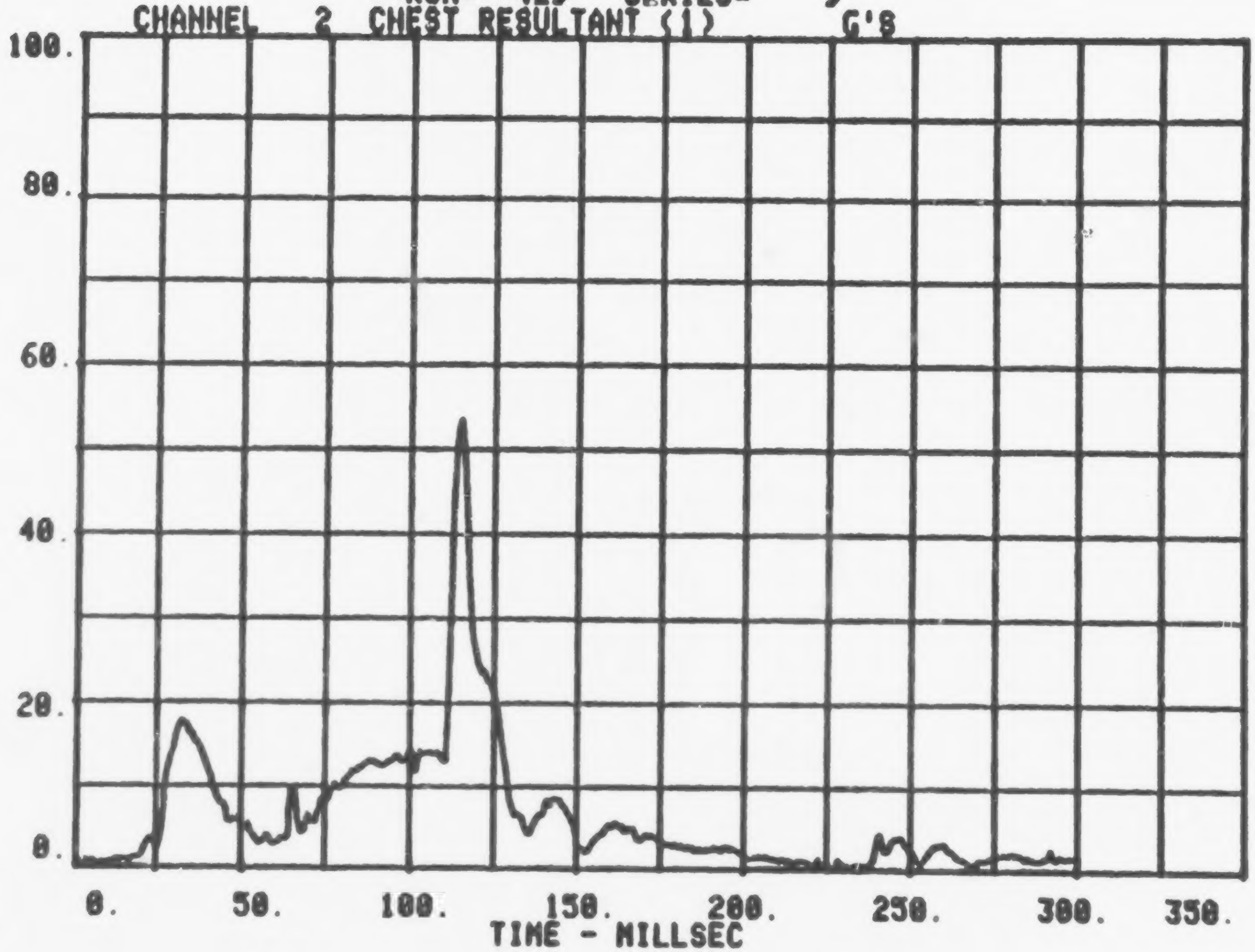
6440-V-5


RUN= 429 SERIES= 9
CHANNEL 6 CHEST Z(1)
G'S
80
60
40
20
0
-20
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

641

642



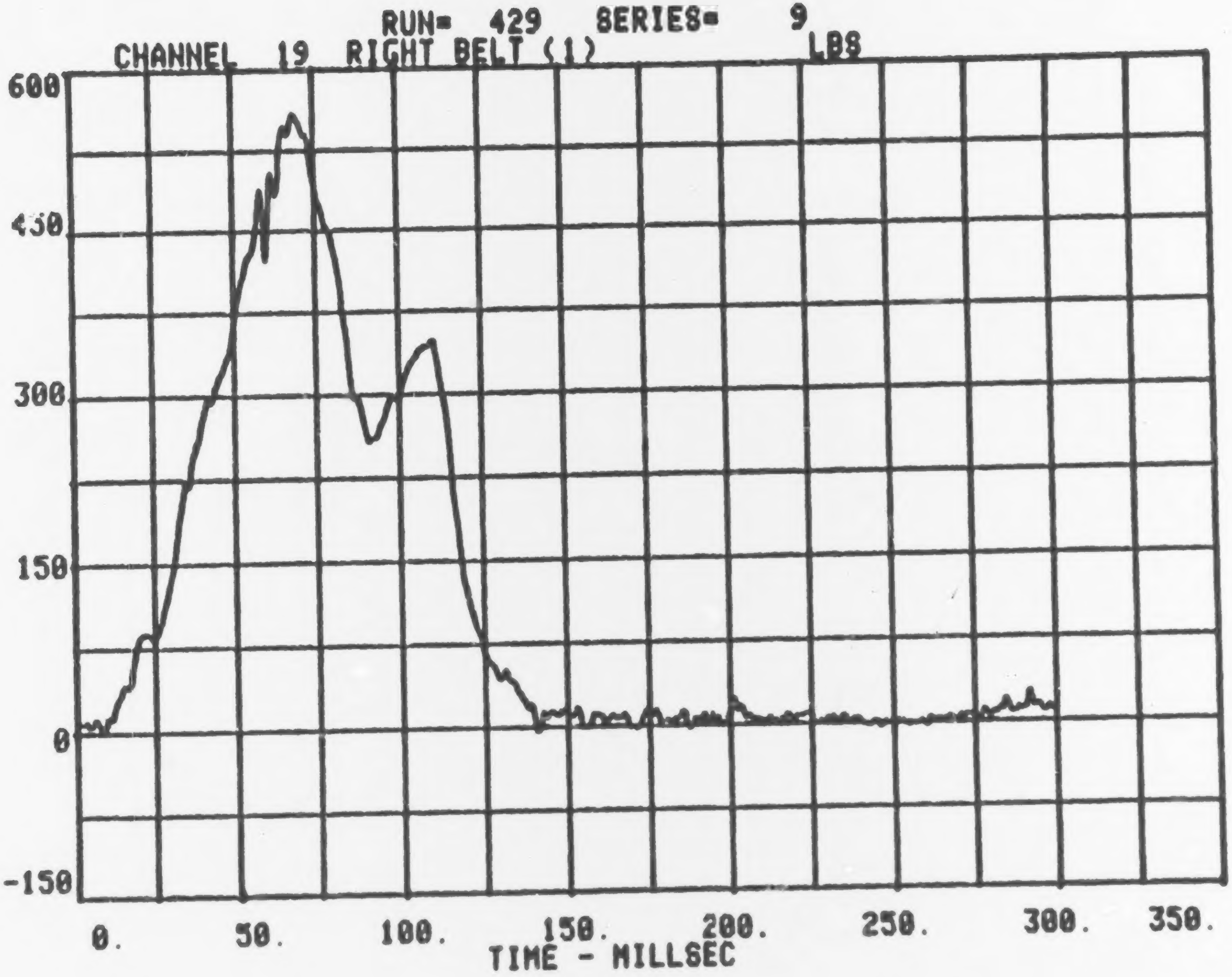
RUN= 429 SERIES= 9
CHANNEL 2 CHEST RESULTANT (1) G'S
100.
80.
60.
40.
20.
0.
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

```
           HEAD INJURY CRITERION
            HEAD SEVERITY INDEX

        BUS TEST

        RUN= 429

        CHEST RESULTANT (1)

HIC=  87.4   FROM T1= .11160   TO T2= .12570

AVERAGE ACCELERATION BETWEEN T1 AND T2=  32.9G'S

EVENT TIME= 300.0  MSEC

SEVERITY INDEX= 153.7
```

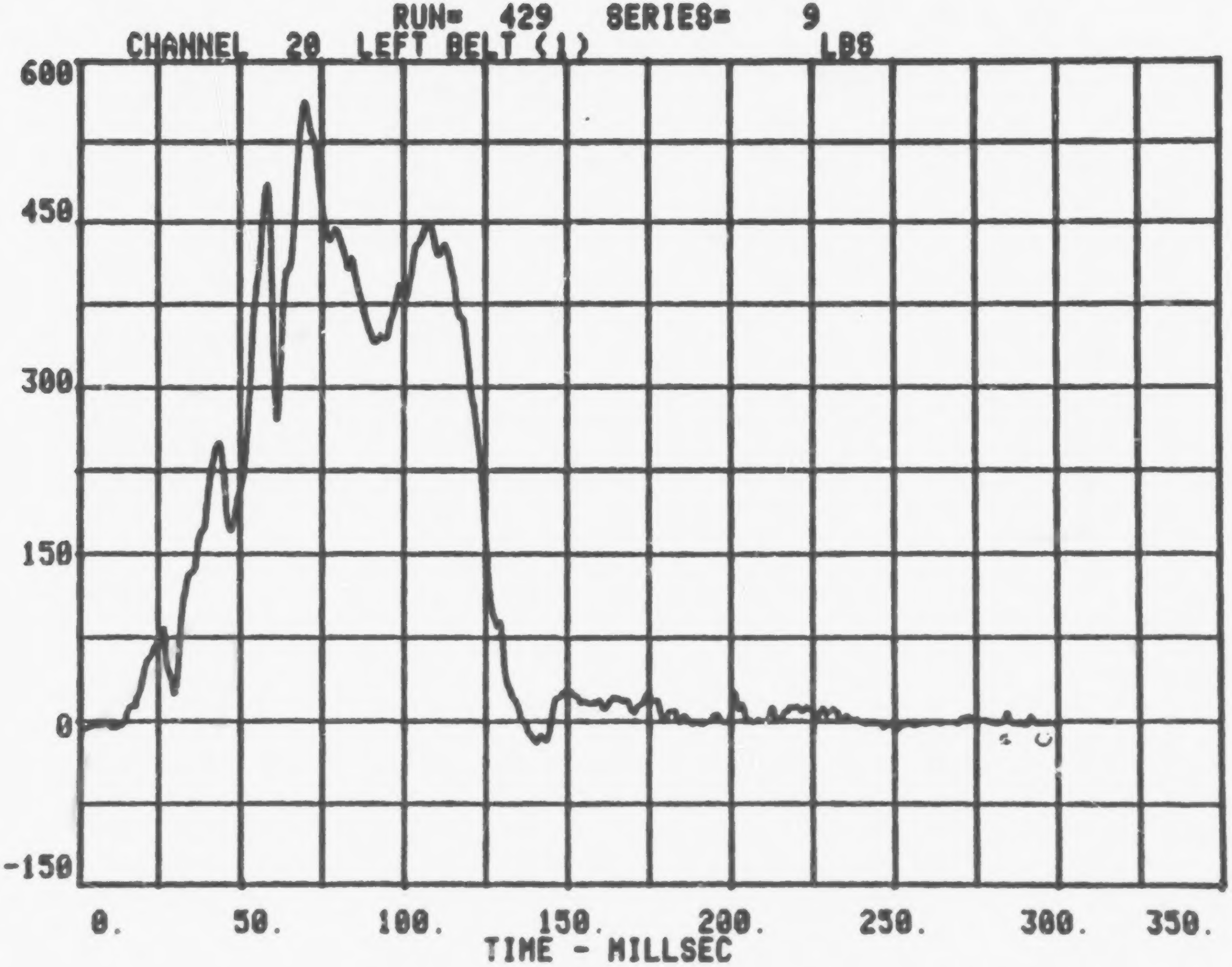
6440-V-5

644



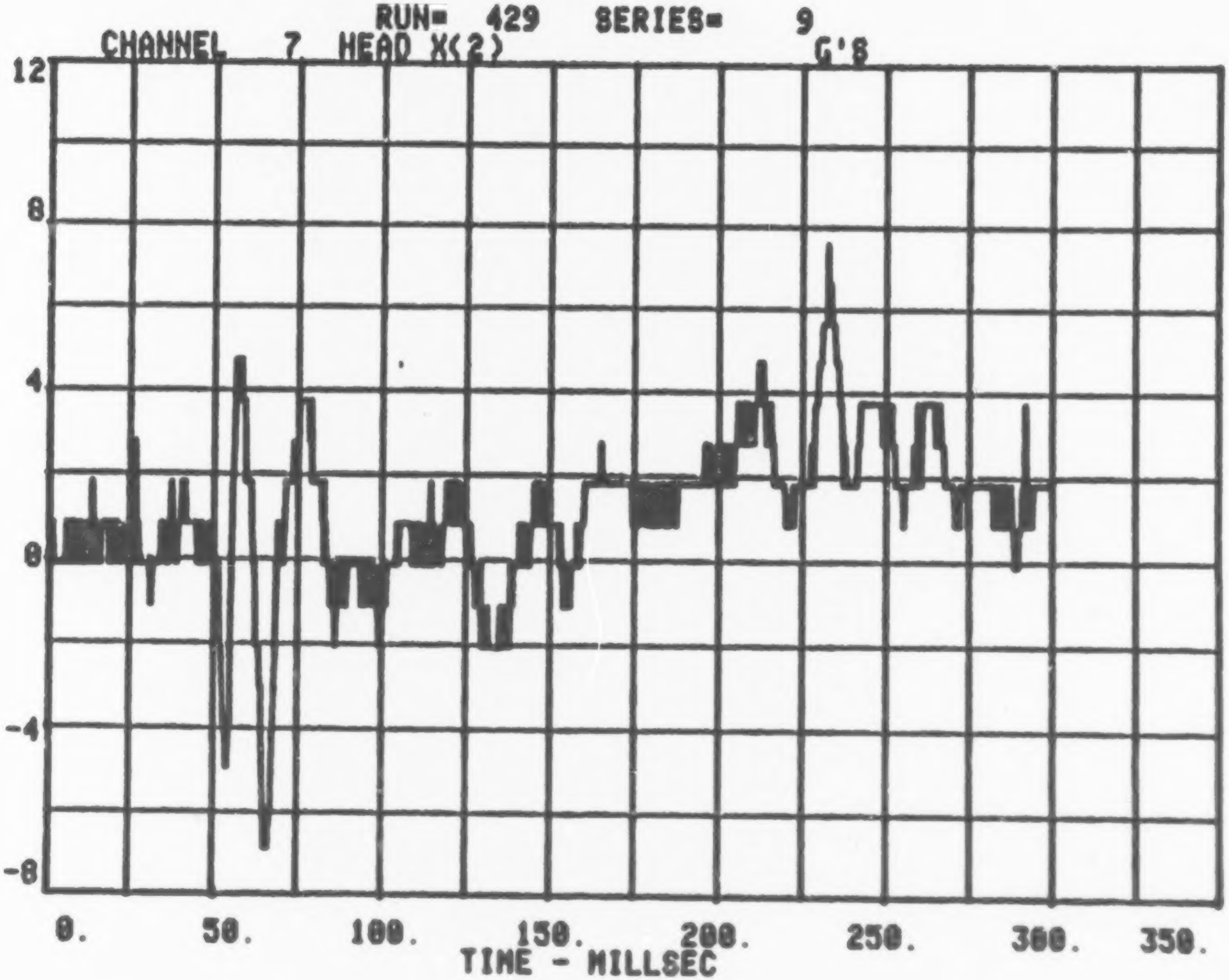
RUN= 429 SERIES= 9
CHANNEL 19 RIGHT BELT (1)
LBS
600
450
300
150
0
-150
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

644-V-5


RUN= 429 SERIES= 9
CHANNEL 20 LEFT BELT (1) LBS
600
450
300
150
0
-150
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

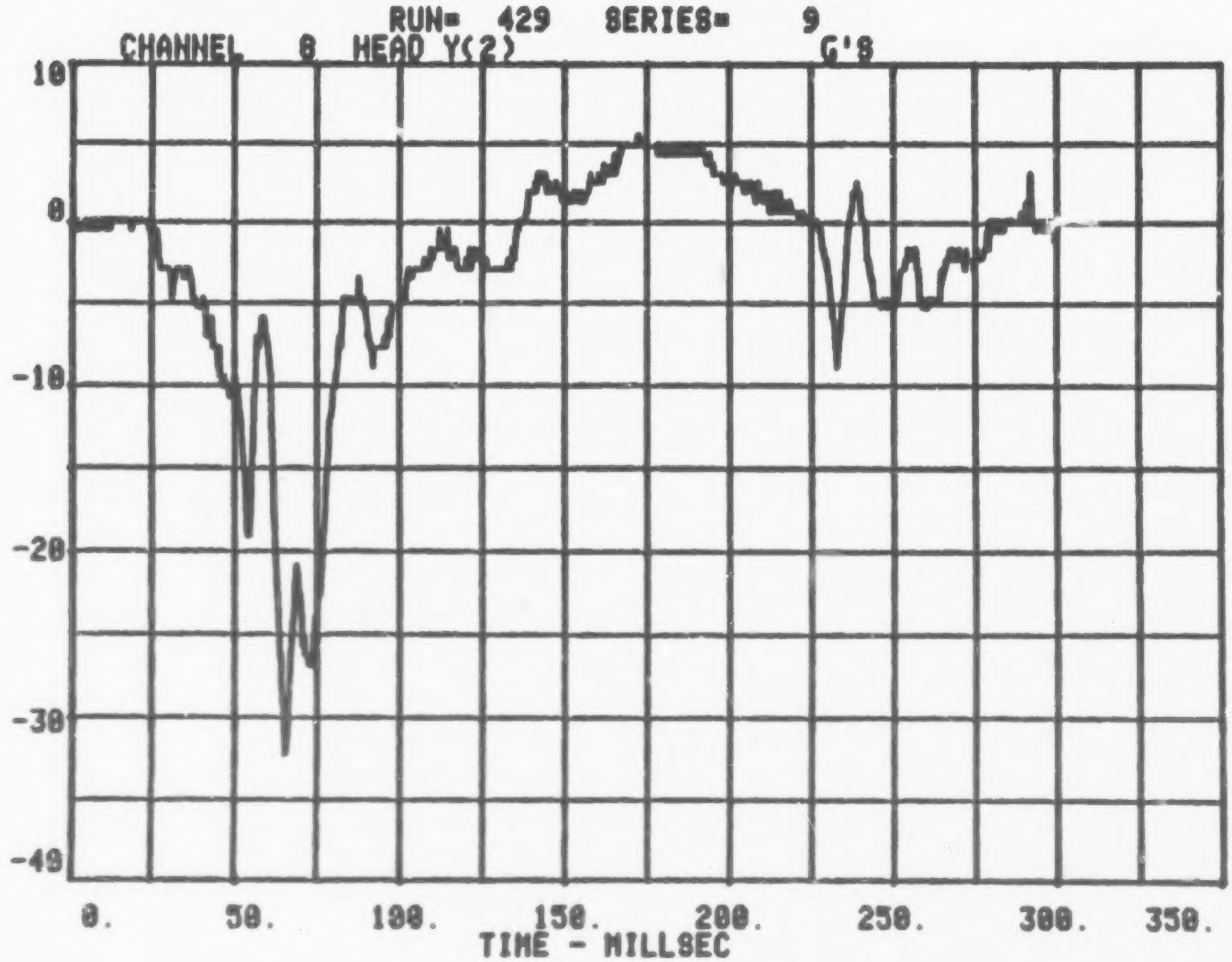
6440-V-5

6416



RUN= 429 SERIES= 9
CHANNEL 7 HEAD X(2)
G'S
12
8
4
0
-4
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

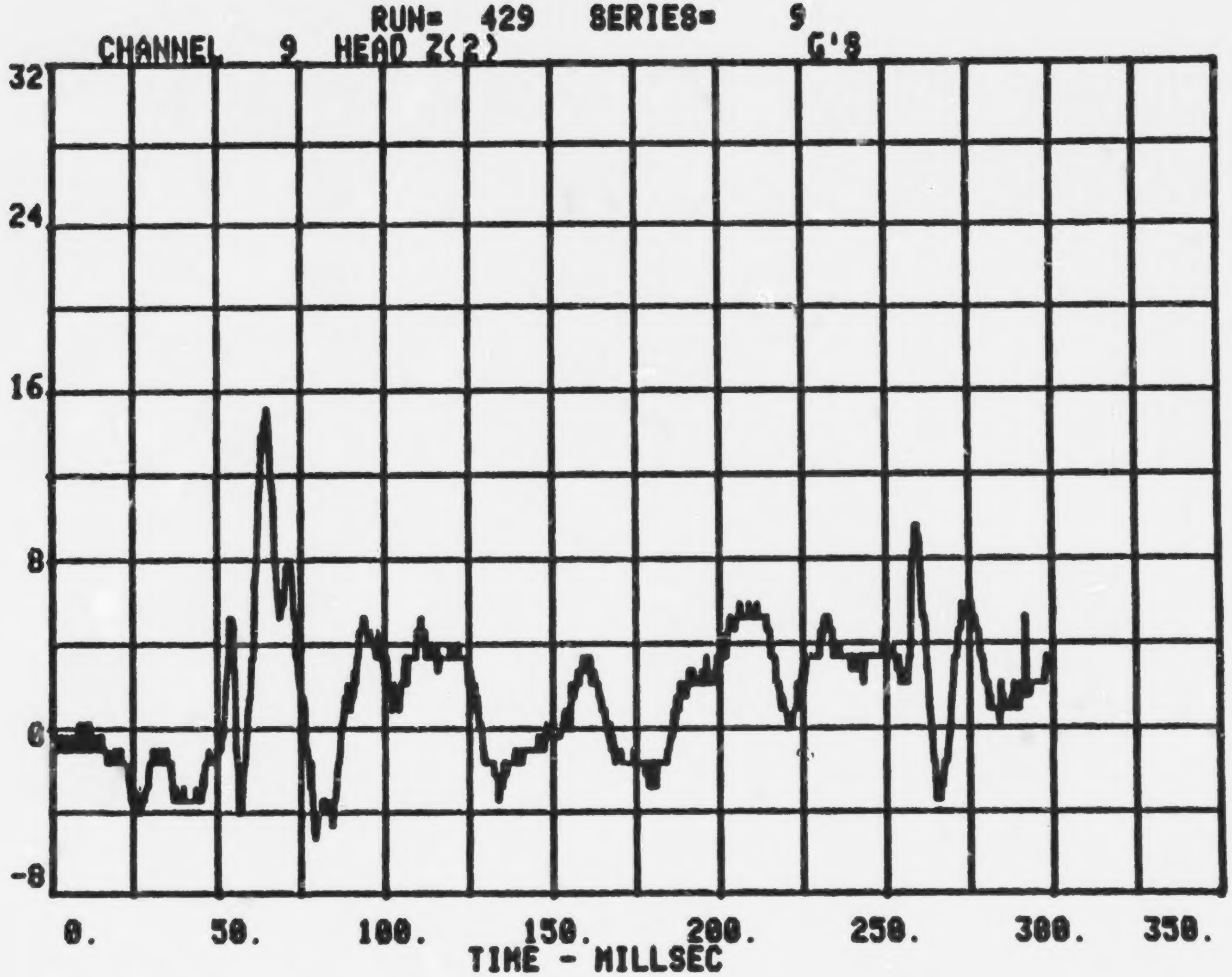
6440-V-5


RUN= 429 SERIES= 9
CHANNEL 8 HEAD Y(2) G'S
10
0
-10
-20
-30
-40
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

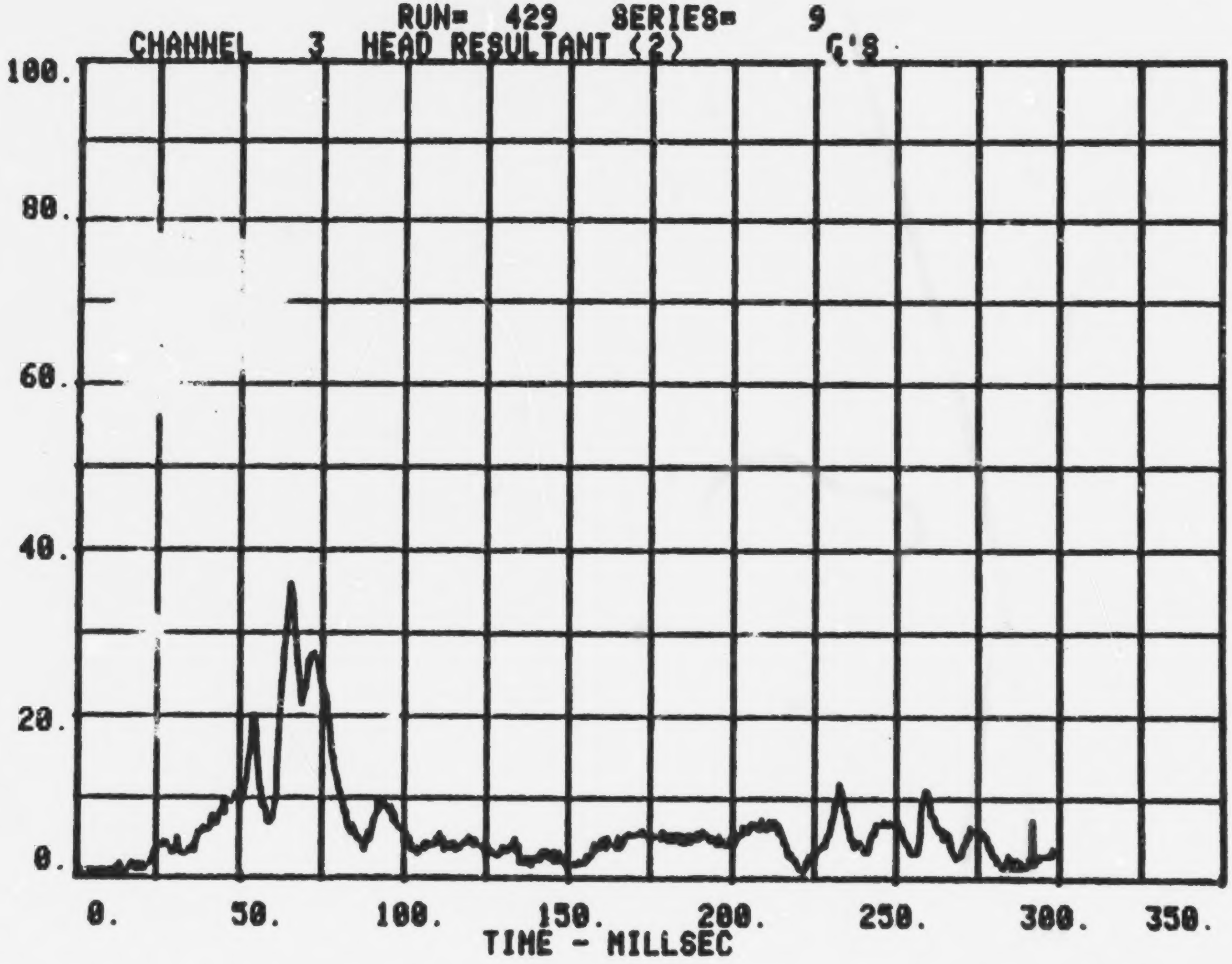
6440-V-5

647

648


RUN= 429 SERIES= 9
CHANNEL 9 HEAD Z(2)
G'S
32
24
16
8
0
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5


RUN= 429 SERIES= 9
CHANNEL 3 HEAD RESULTANT (2) G'S
100.
80.
60.
40.
20.
0.
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

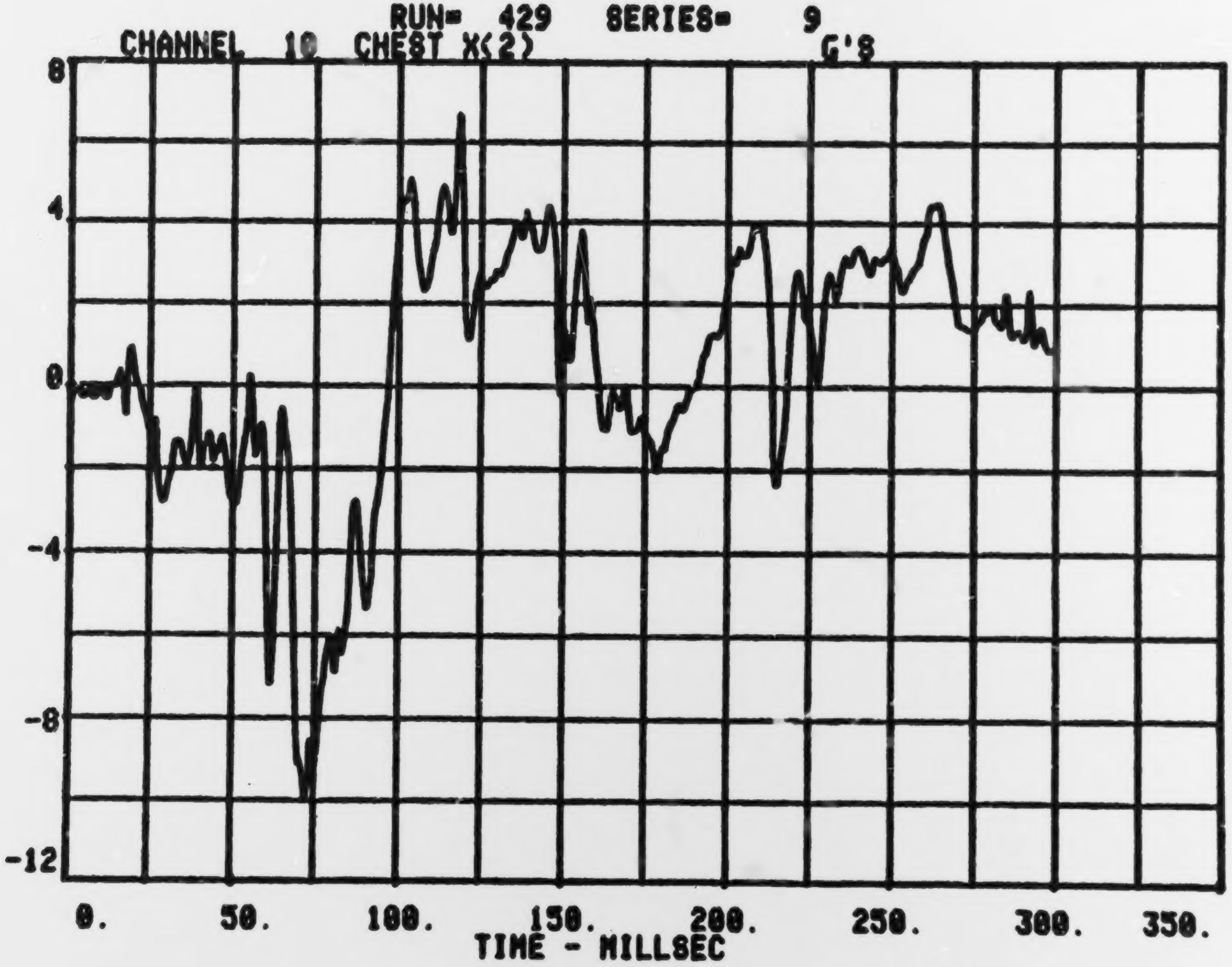
6550-V-5

6<19

650

```
                    HEAD INJURY CRITERION
                     HEAD SEVERITY INDEX

                BUS TEST

                RUN= 429

                HEAD RESULTANT (2)

         HIC=  56.7   FROM T1= .06120   TO T2= .07800

         AVERAGE ACCELERATION BETWEEN T1 AND T2=  25.8G'S

         EVENT TIME= 300.0  MSEC

         SEVERITY INDEX=  86.4
```

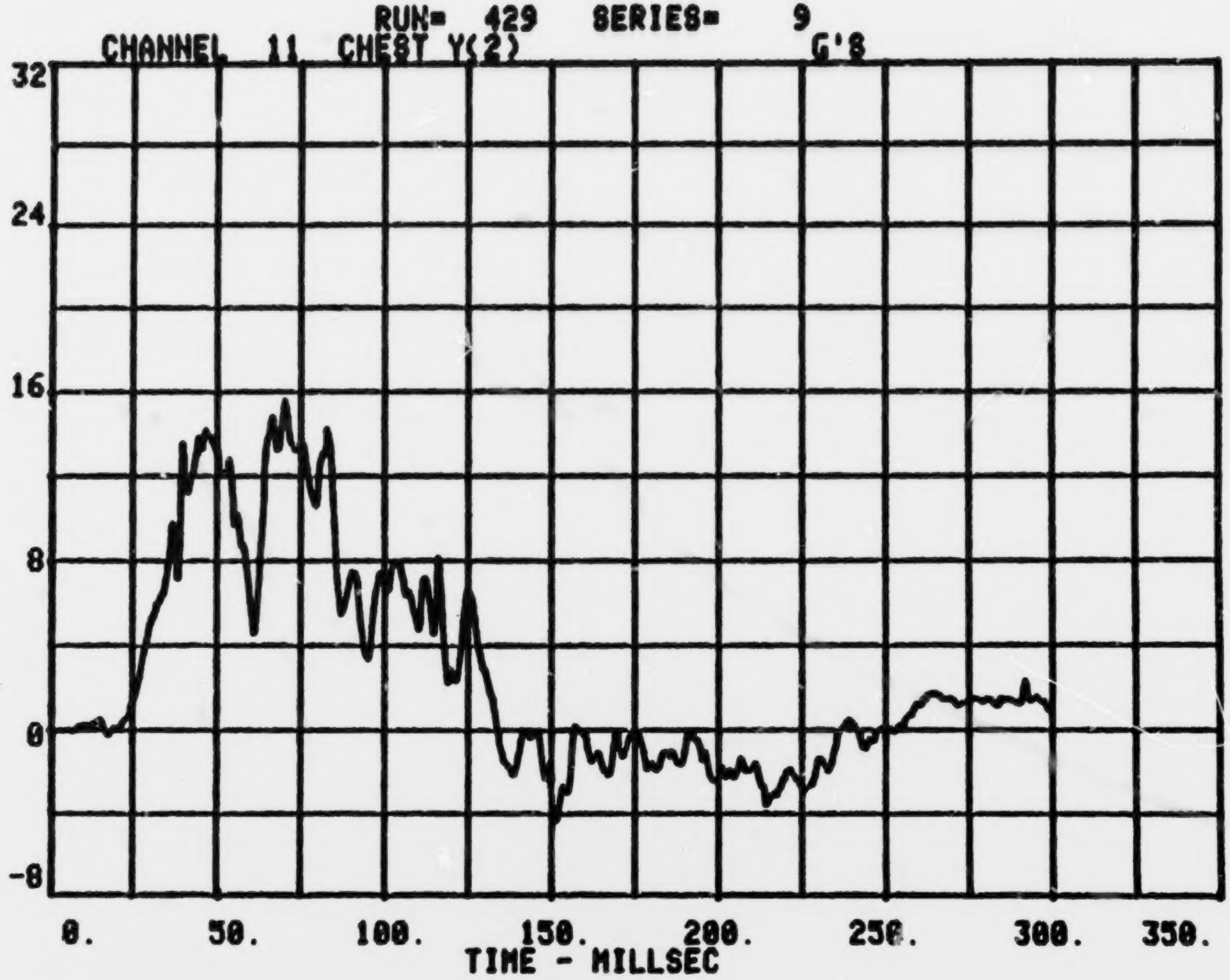
6440-V-5


RUN= 429 SERIES= 9
CHANNEL 10 CHEST X(2)
G'S
8
4
0
-4
-8
-12
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

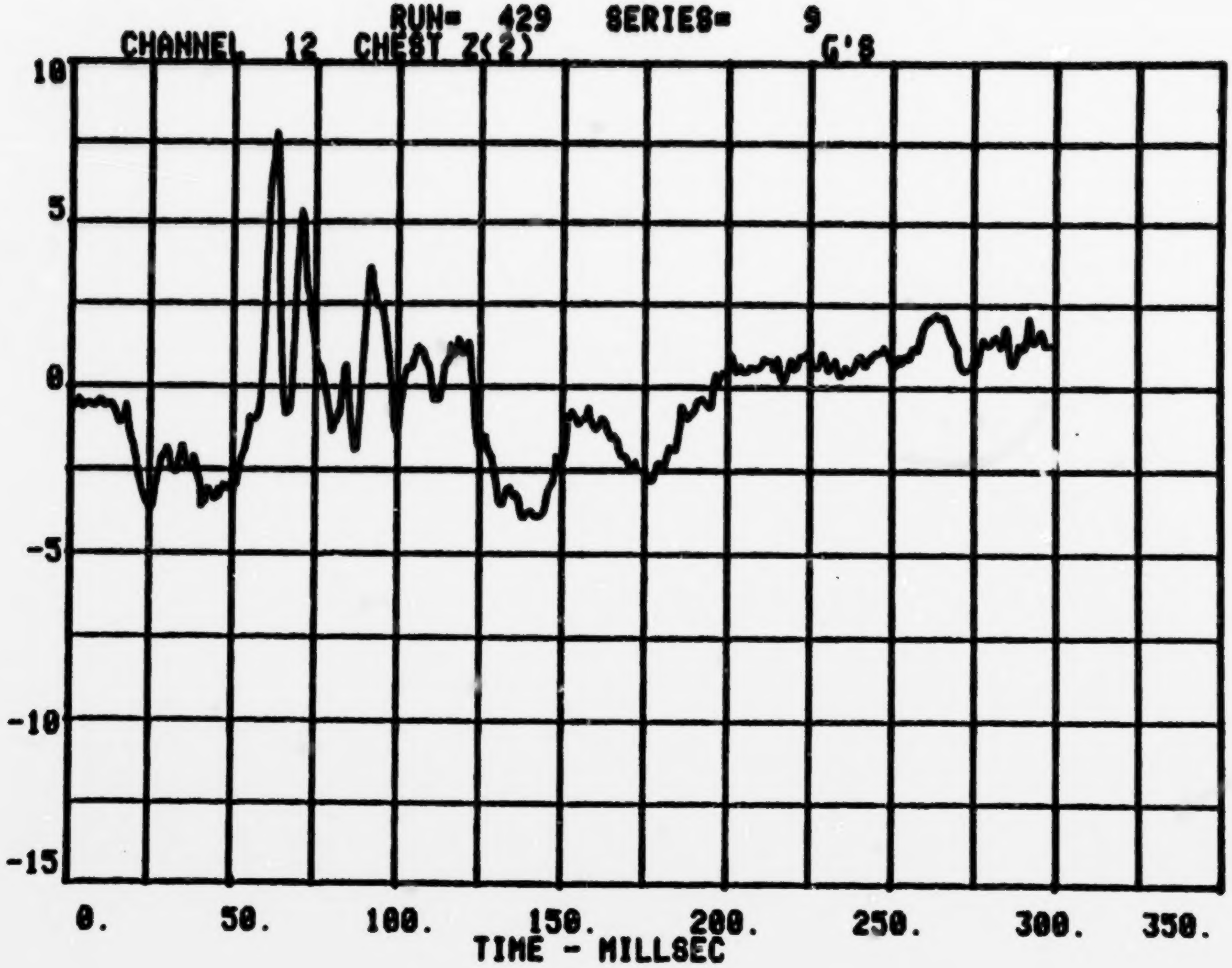
6440-V-5

651

652

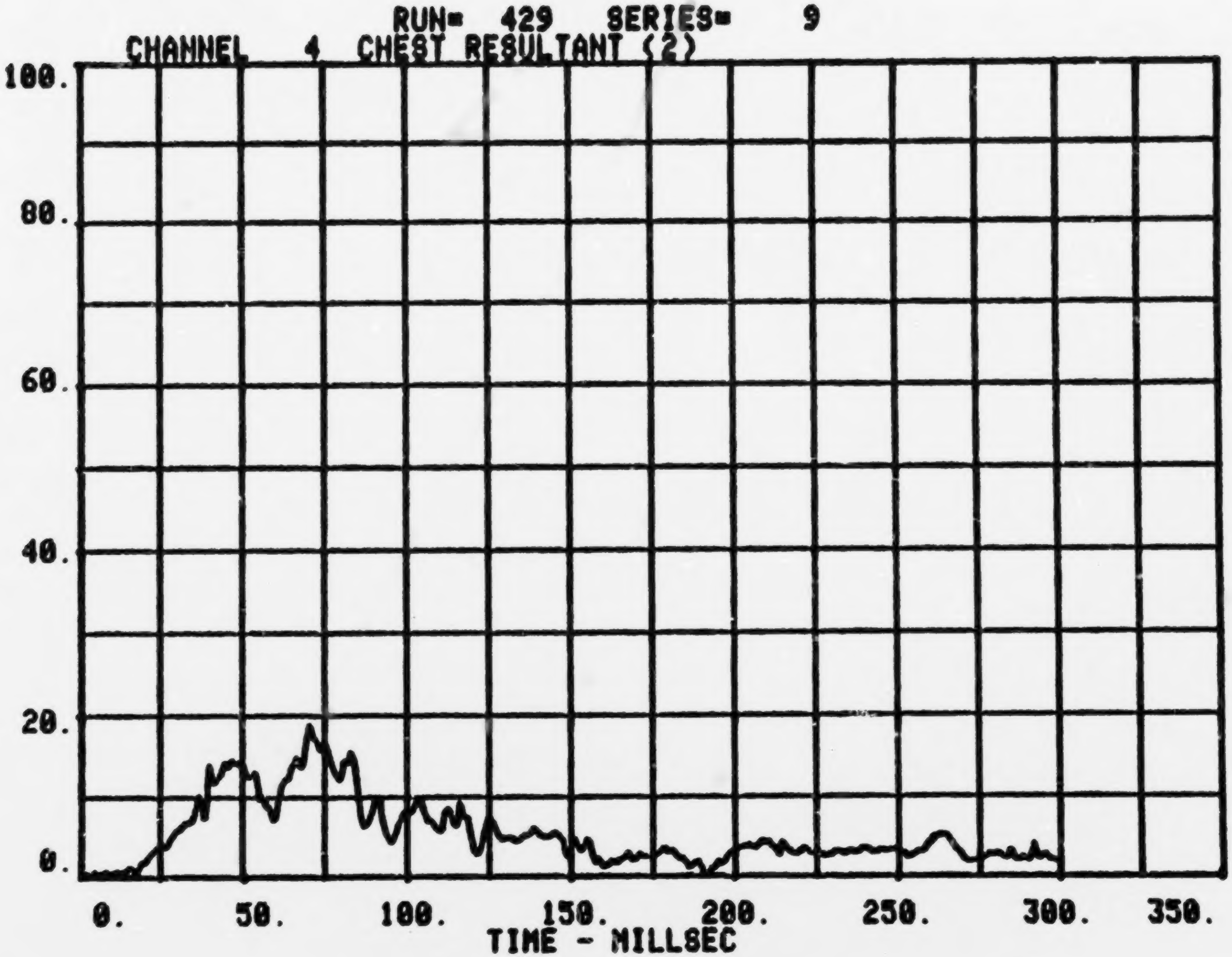

RUN= 429 SERIES= 9
CHANNEL 11 CHEST Y(2)
G'S
32
24
16
8
0
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5


RUN= 429 SERIES= 9
CHANNEL 12 CHEST Z(2) G'S
10
5
0
-5
-10
-15
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

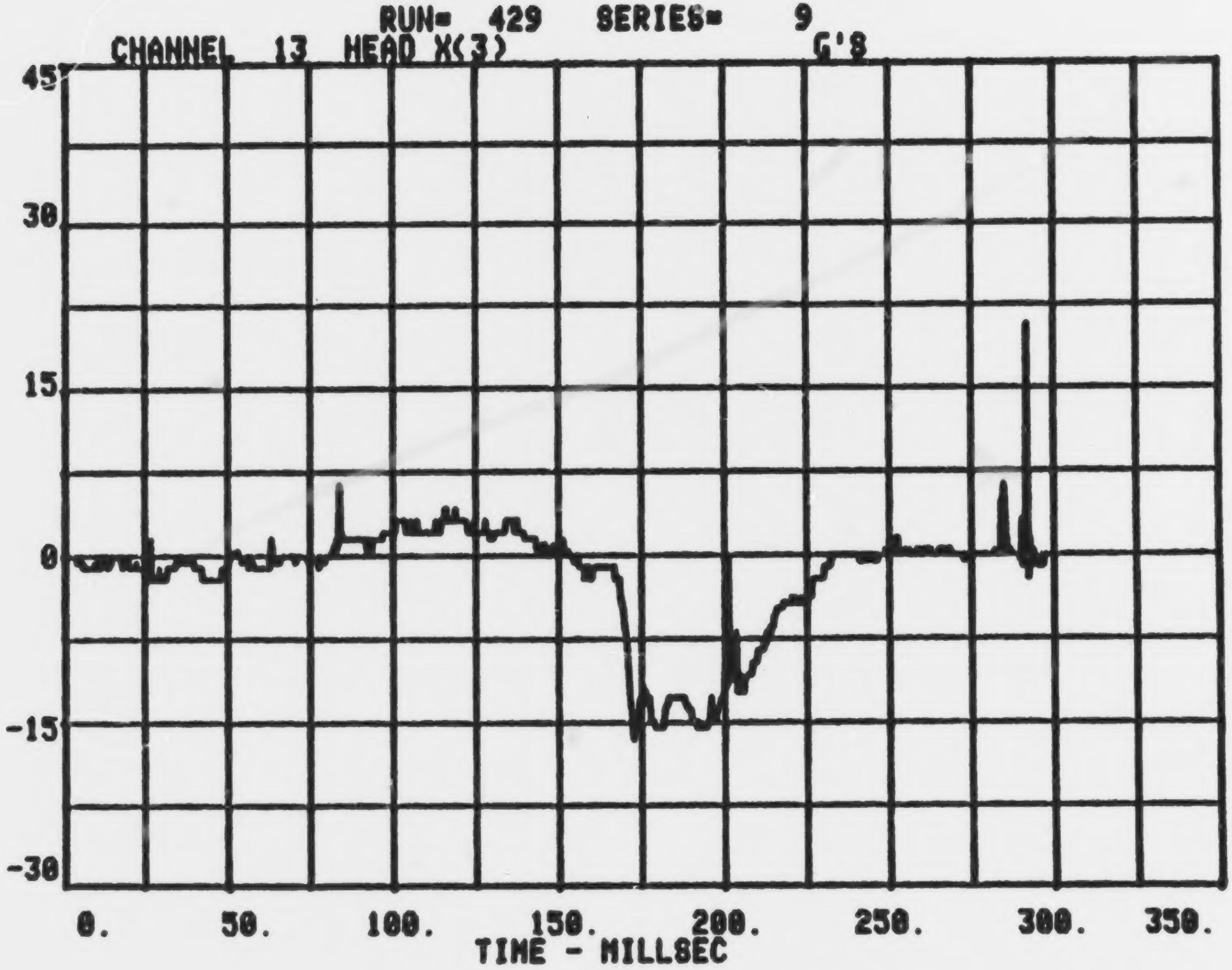
654


RUN= 429 SERIES= 9
CHANNEL 4 CHEST RESULTANT (2)
100.
80.
60.
40.
20.
0.
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

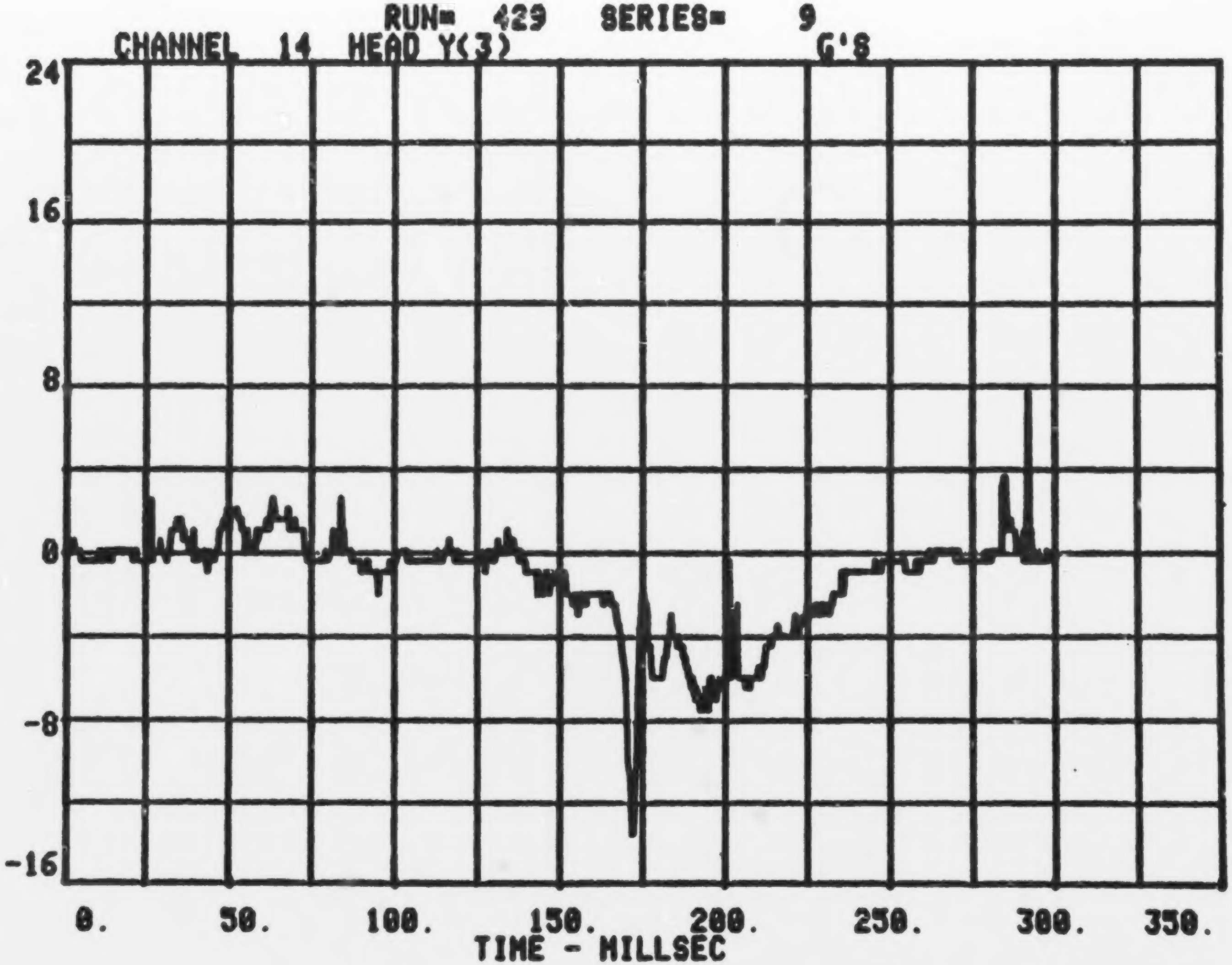
6440-V-5

```
                        HEAD INJURY CRITERION
                         HEAD SEVERITY INDEX

                  BUS TEST

                  RUN= 429

                  CHEST RESULTANT (2)

          HIC=  32.6   FROM T1= .03120   TO T2= .11880

          AVERAGE ACCELERATION BETWEEN T1 AND T2=  10.7G'S

          EVENT TIME= 300.0  MSEC

          SEVERITY INDEX=  44.4
```

656

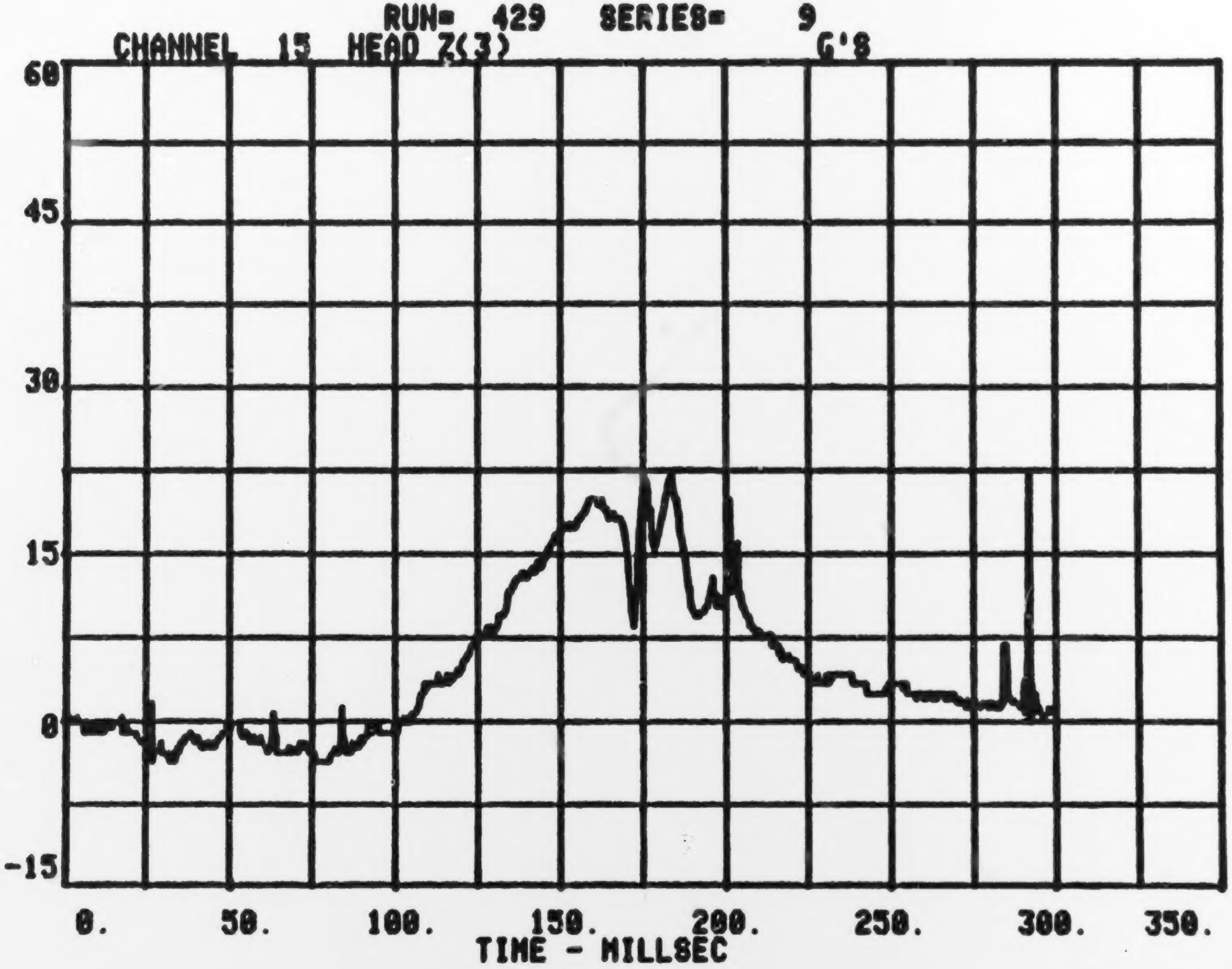

RUN= 429 SERIES= 9
CHANNEL 13 HEAD X(3)
G'S
45
30
15
0
-15
-30
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

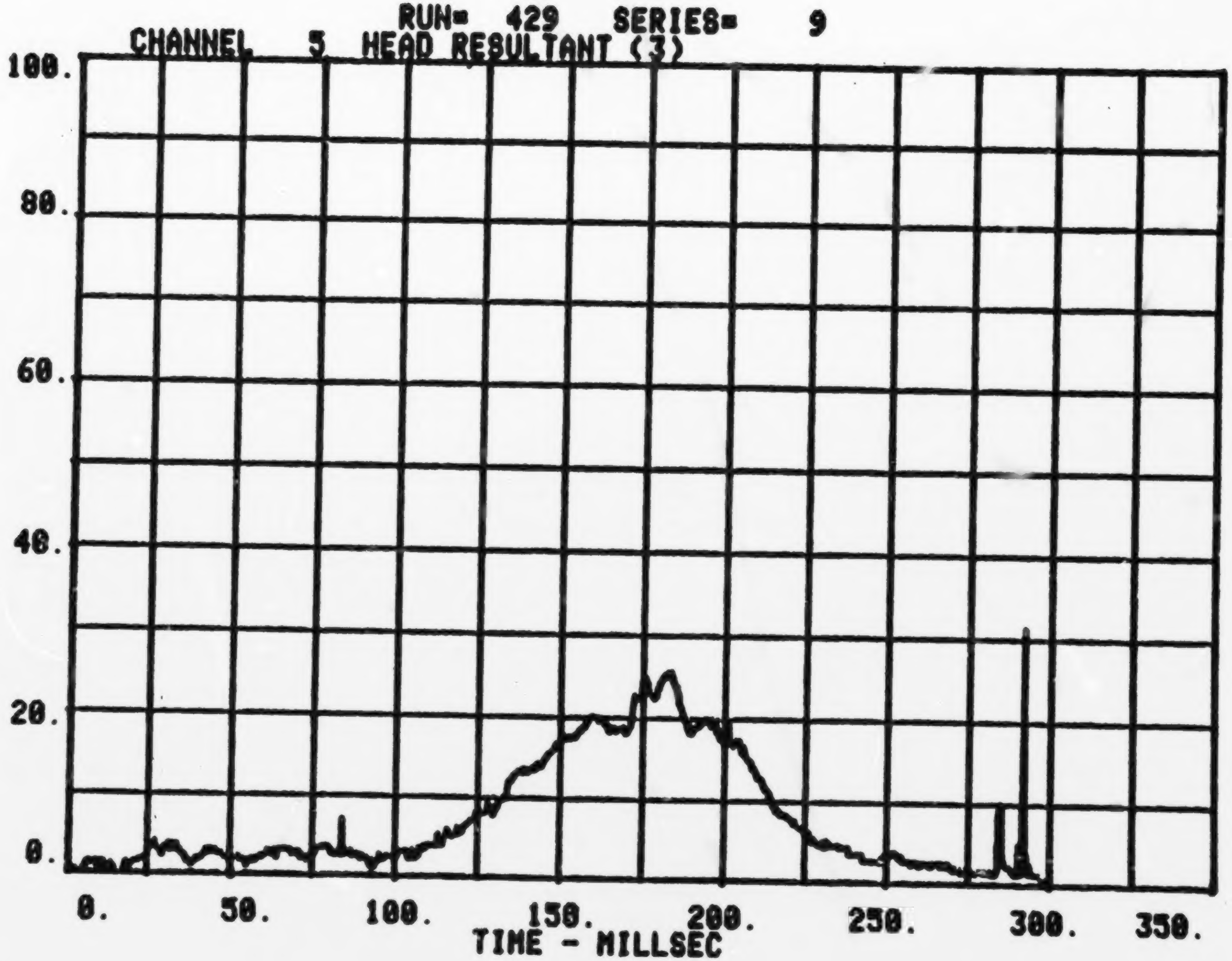

RUN= 429 SERIES= 9
CHANNEL 14 HEAD Y(3)
G'S
24
16
8
0
-8
-16
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

658


RUN= 429 SERIES= 9
CHANNEL 15 HEAD Z(3)
G'S
60
45
30
15
0
-15
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

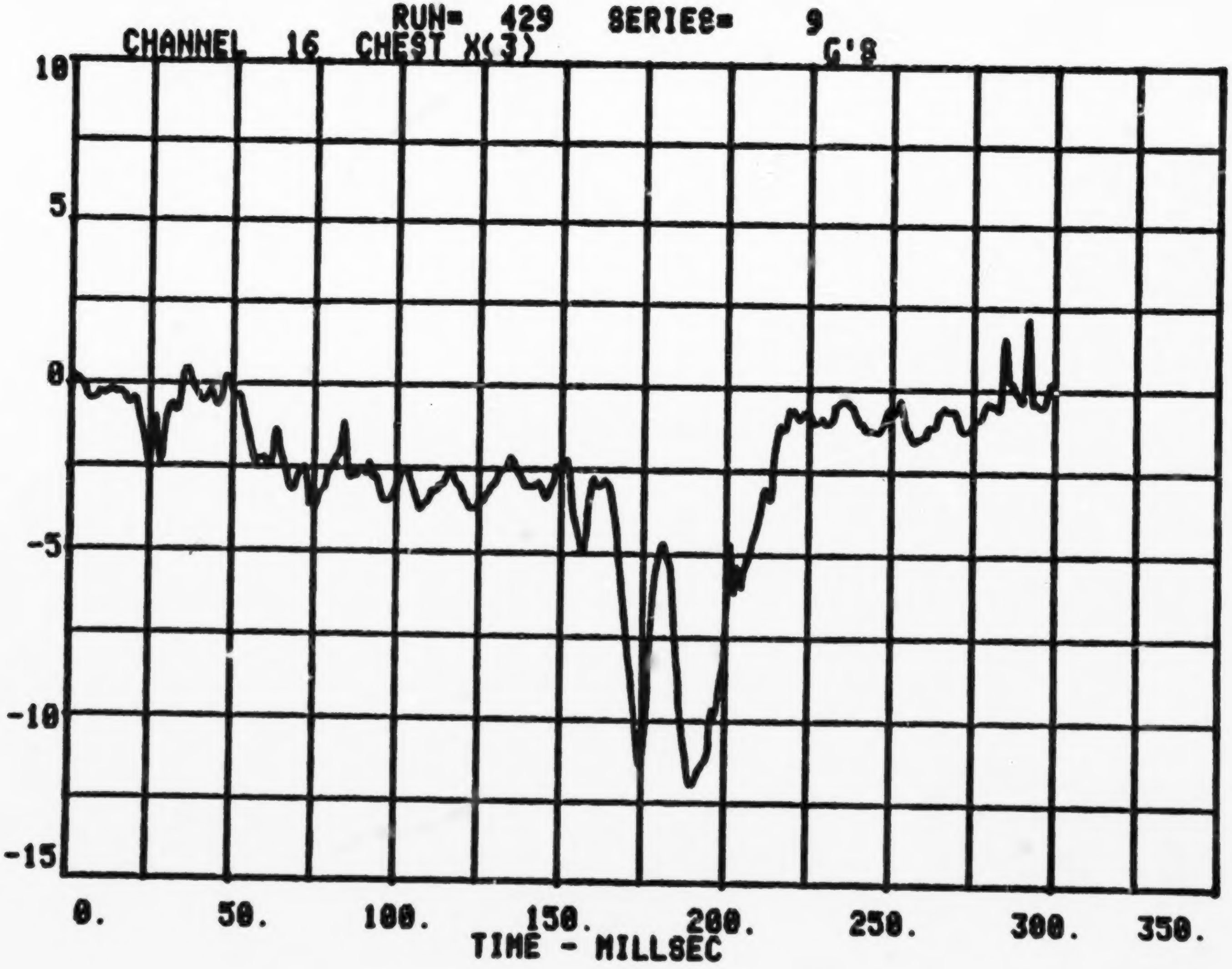
6440-V-5

RUN= 429 SERIES= 9
CHANNEL 5 HEAD RESULTANT (3)
100.
80.
60.
40.
20.
0.
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

659

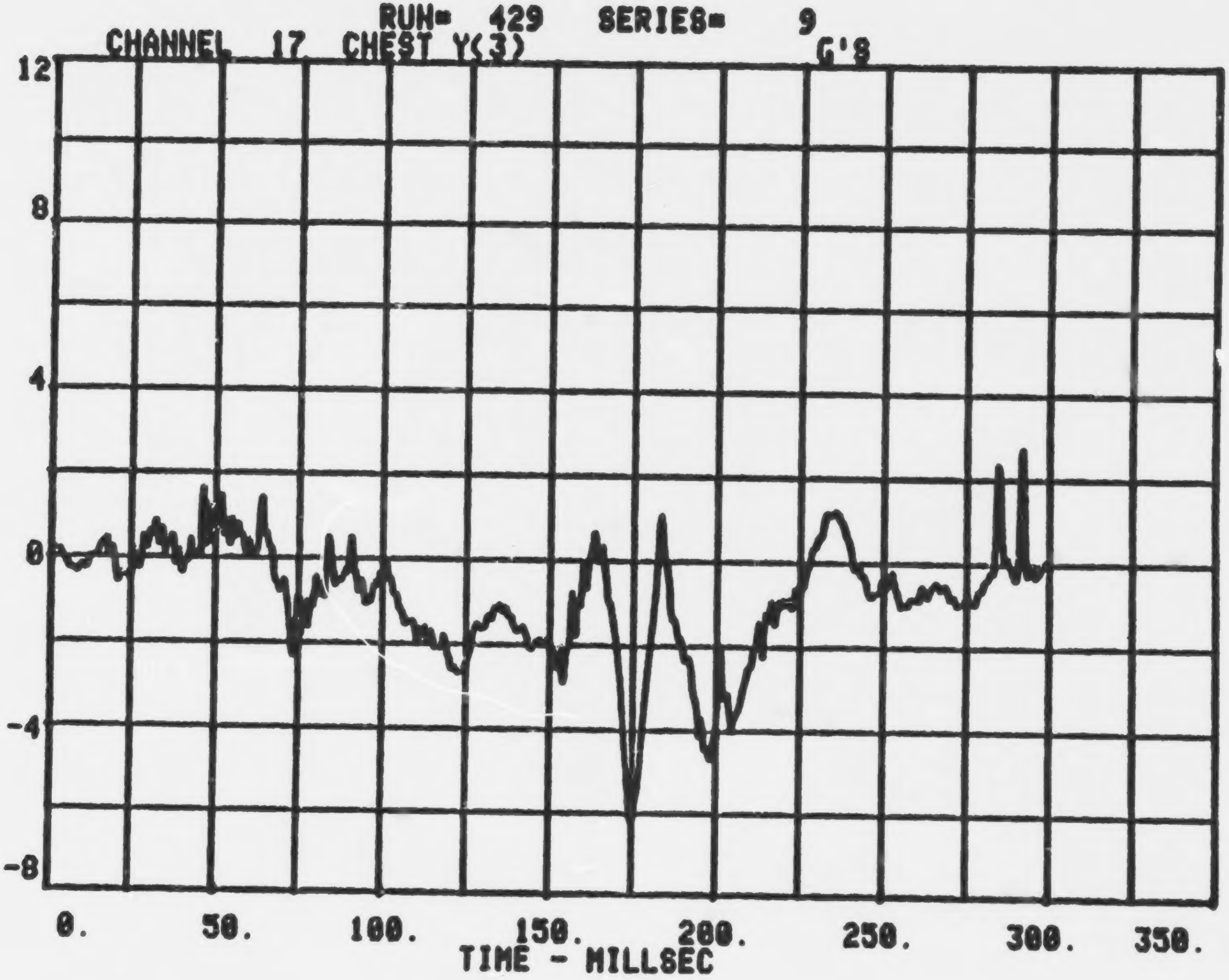
```
                     HEAD INJURY CRITERION
                     HEAD SEVERITY INDEX

               BUS TEST

               RUN= 429

               HEAD RESULTANT (3)

HIC= 114.1   FROM T1= .13410   TO T2= .21450

AVERAGE ACCELERATION BETWEEN T1 AND T2=  18.2G'S

EVENT TIME= 300.0  MSEC

SEVERITY INDEX= 136.3
```


RUN= 429 SERIES= 9
CHANNEL 16 CHEST X(3)
G'S
10
5
0
-5
-10
-15
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

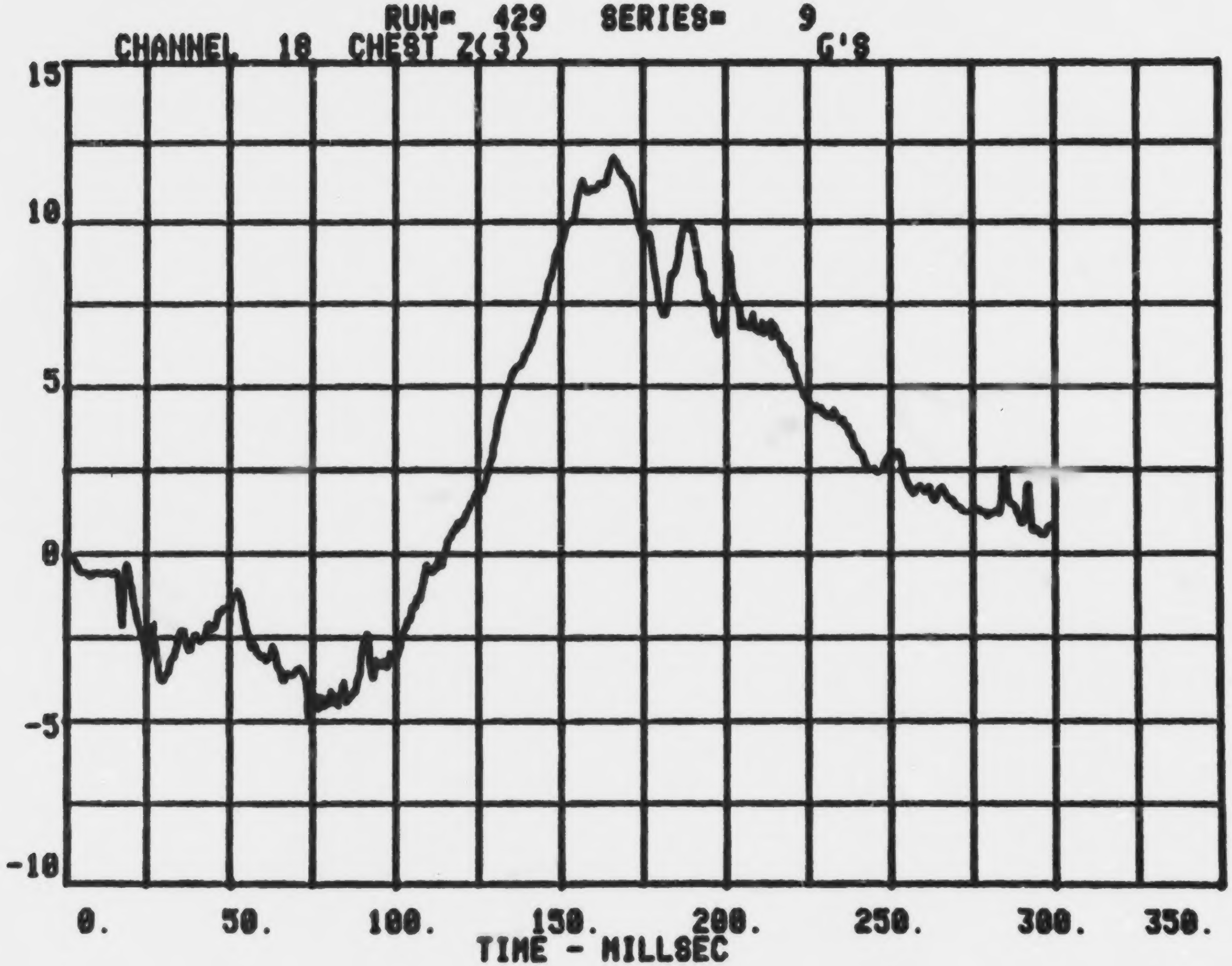
6440-V-5

661

662


RUN= 429 SERIES= 9
CHANNEL 17 CHEST Y(3) G'S
12
8
4
0
-4
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

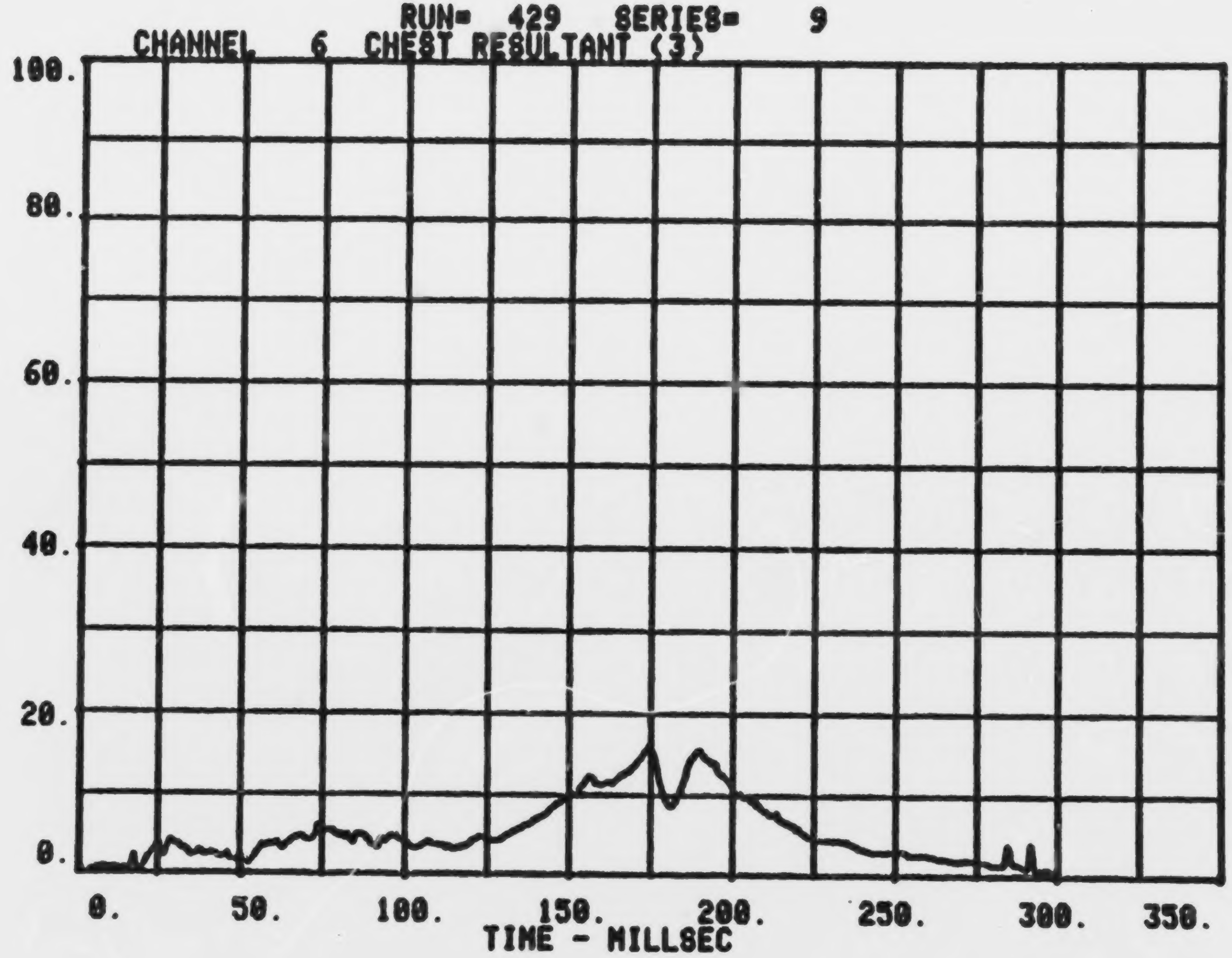
6440-V-5


RUN= 429 SERIES= 9
CHANNEL 18 CHEST Z(3) G'S
15
10
5
0
-5
-10
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

663

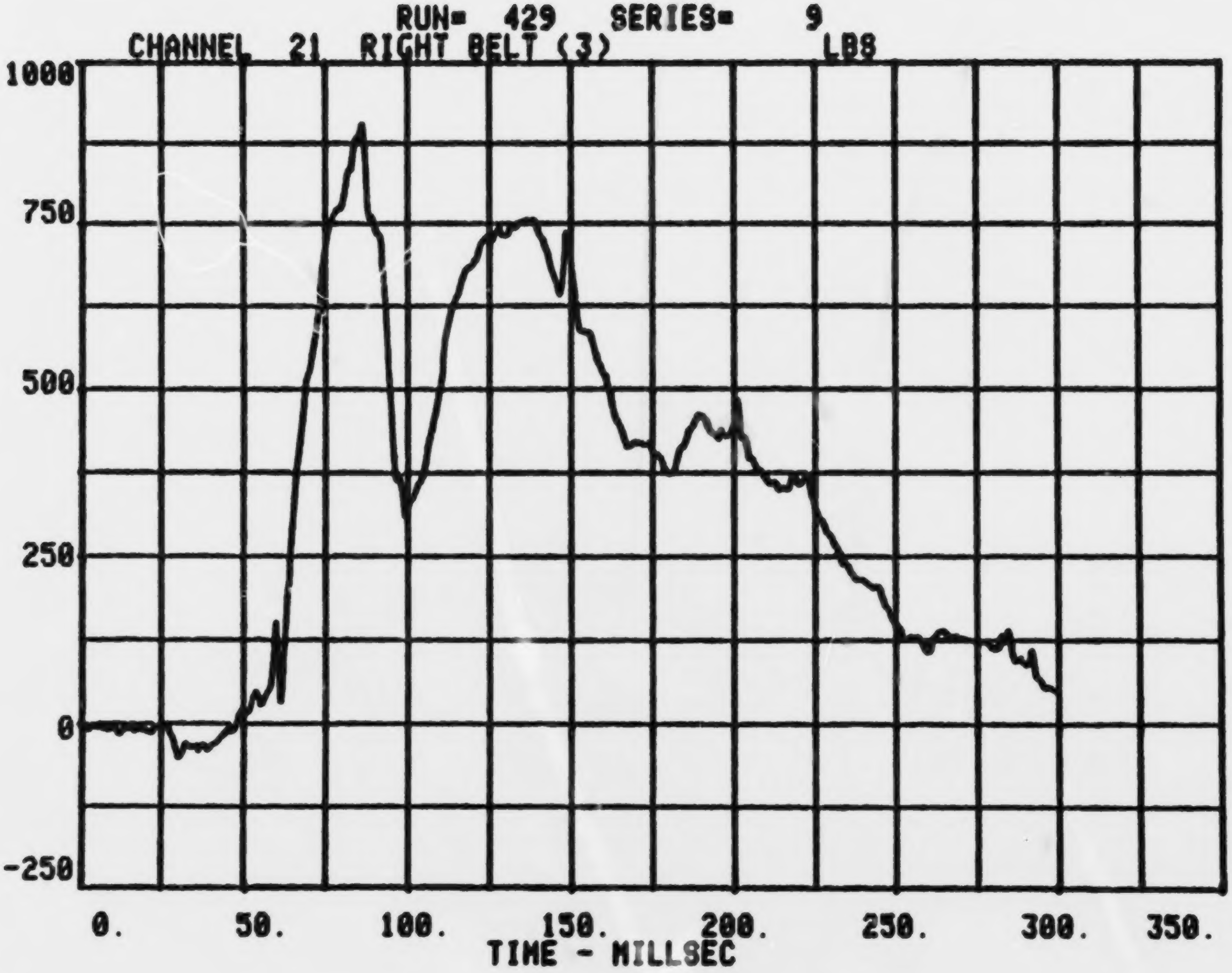
6641


RUN= 429 SERIES= 9
CHANNEL 6 CHEST RESULTANT (3)
100.
80.
60.
40.
20.
0.
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

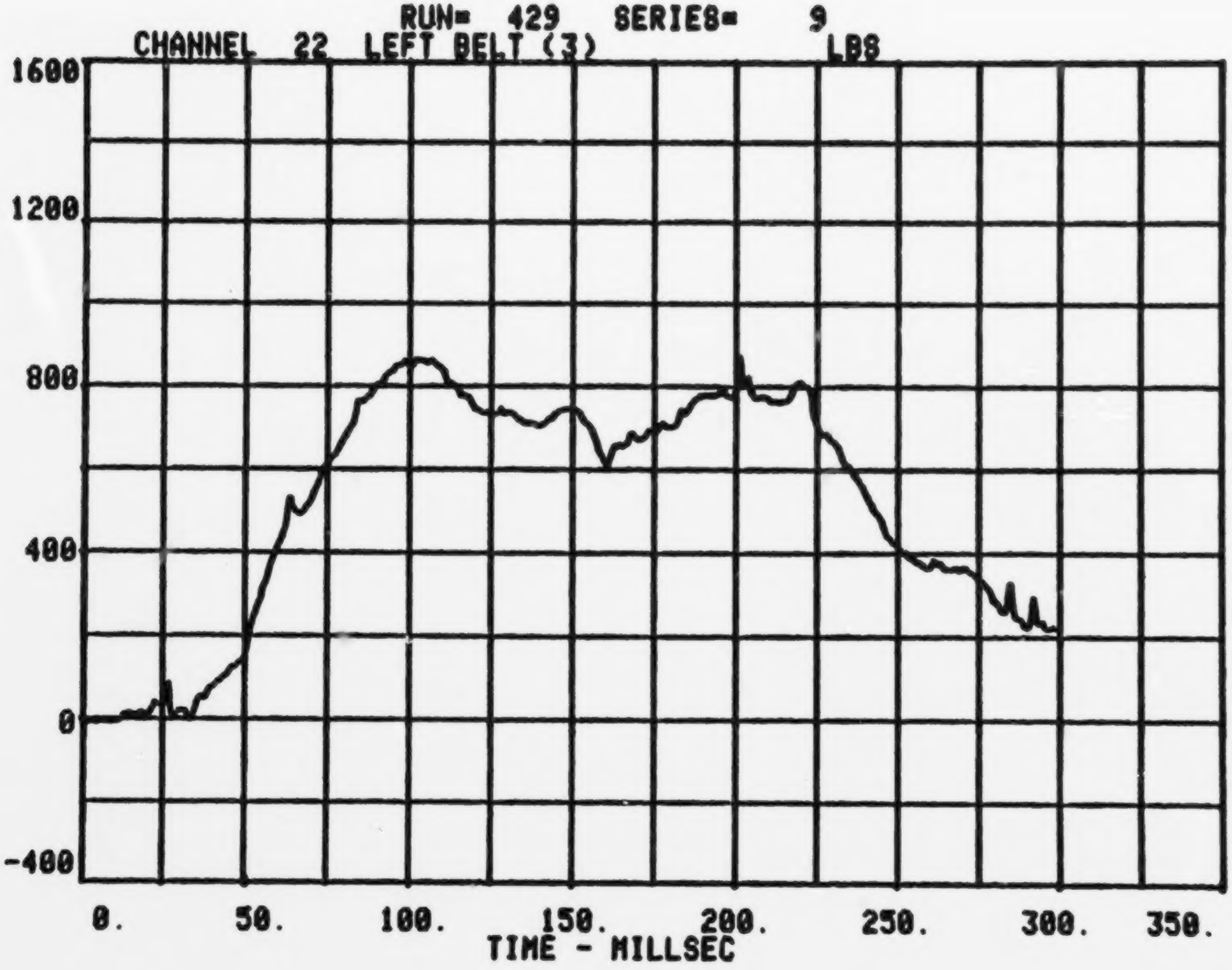
6440-V-5

```
                 HEAD INJURY CRITERION
                  HEAD SEVERITY INDEX

            BUS TEST

            RUN= 429

            CHEST RESULTANT (3)

    HIC=  32.2   FROM T1= .13860   TO T2= .21660

    AVERAGE ACCELERATION BETWEEN T1 AND T2=  11.1G'S

    EVENT TIME= 300.0  MSEC

    SEVERITY INDEX=  41.1
```

666


RUN= 429 SERIES= 9
CHANNEL 21 RIGHT BELT (3) LBS
1000
750
500
250
0
-250
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

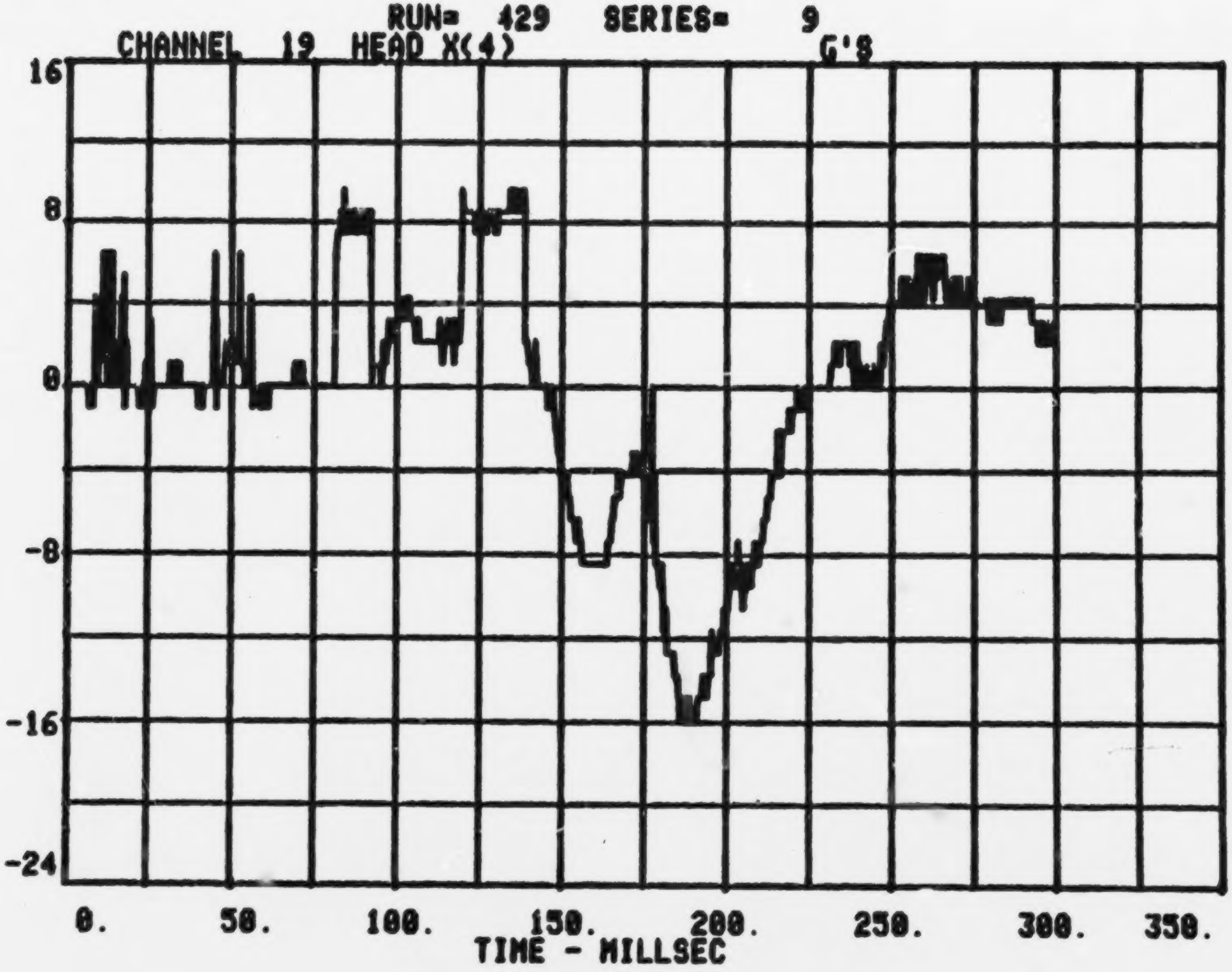


RUN= 429 SERIES= 9

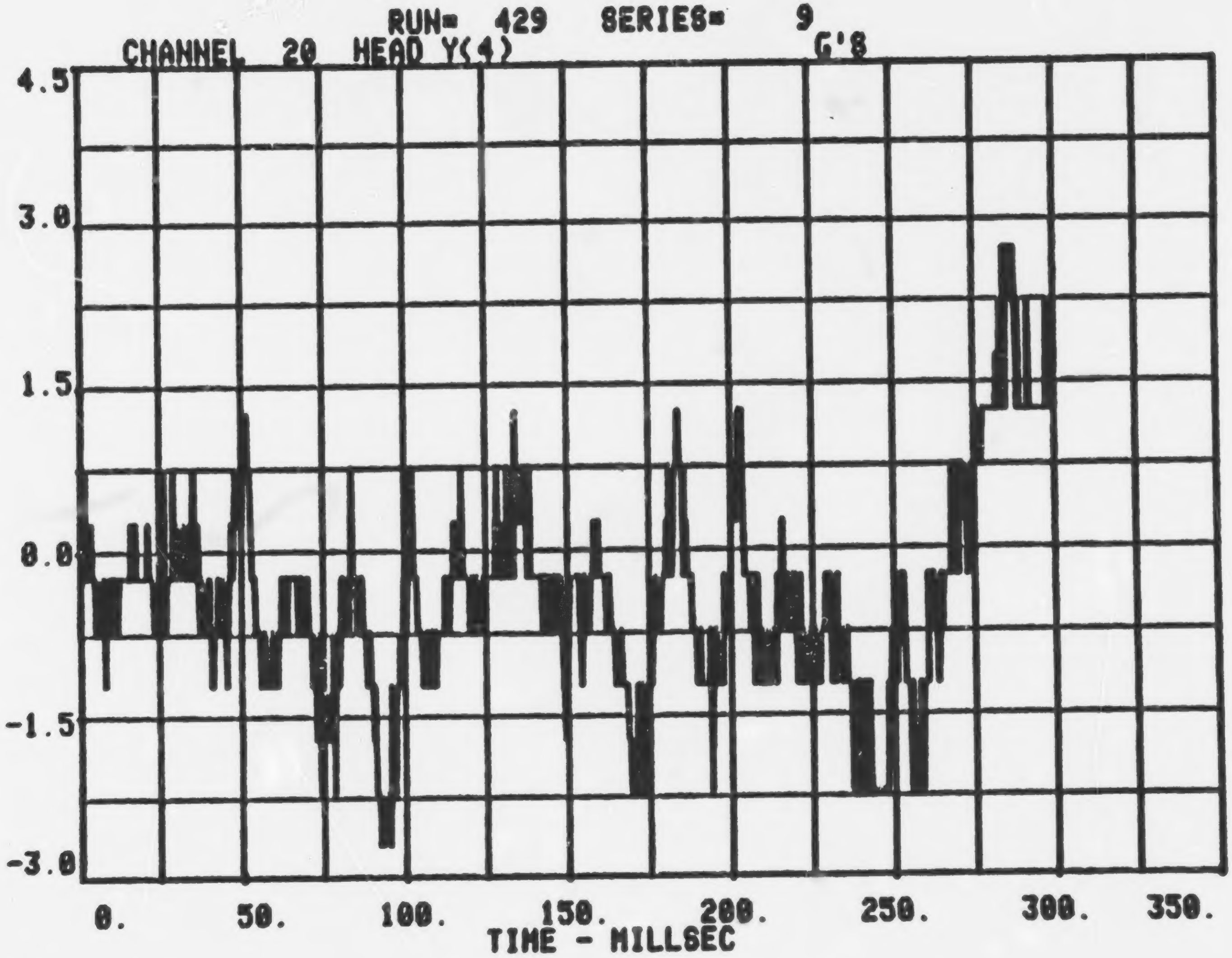
CHANNEL 22 LEFT BELT (3) LBS

6440-V-5

667


RUN= 429 SERIES= 9
CHANNEL 19 HEAD X(4)
G'S
16
8
0
-8
-16
-24
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

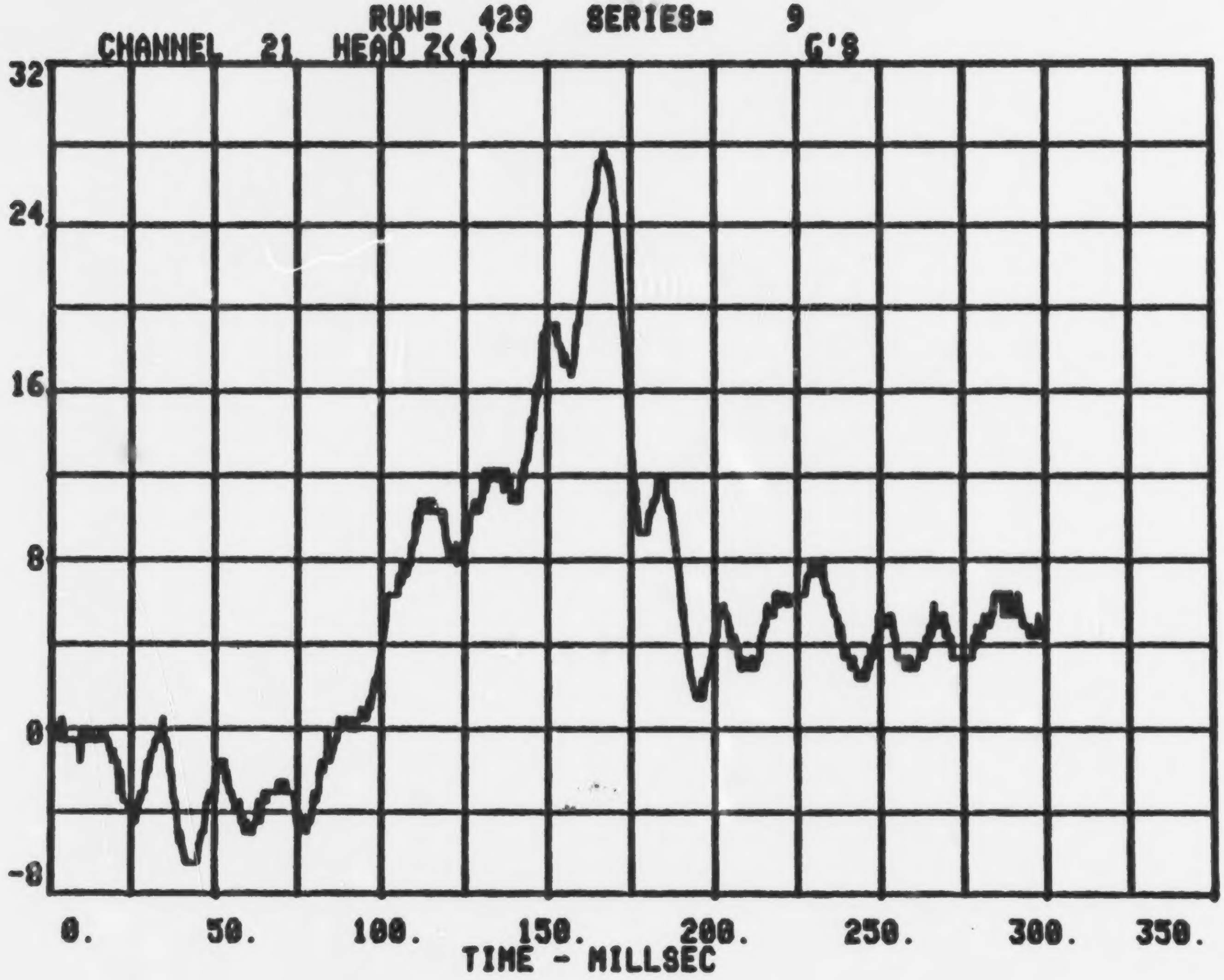
6440-V-5


RUN= 429 SERIES= 9
CHANNEL 20 HEAD Y(4)
G'S
4.5
3.0
1.5
0.0
-1.5
-3.0
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

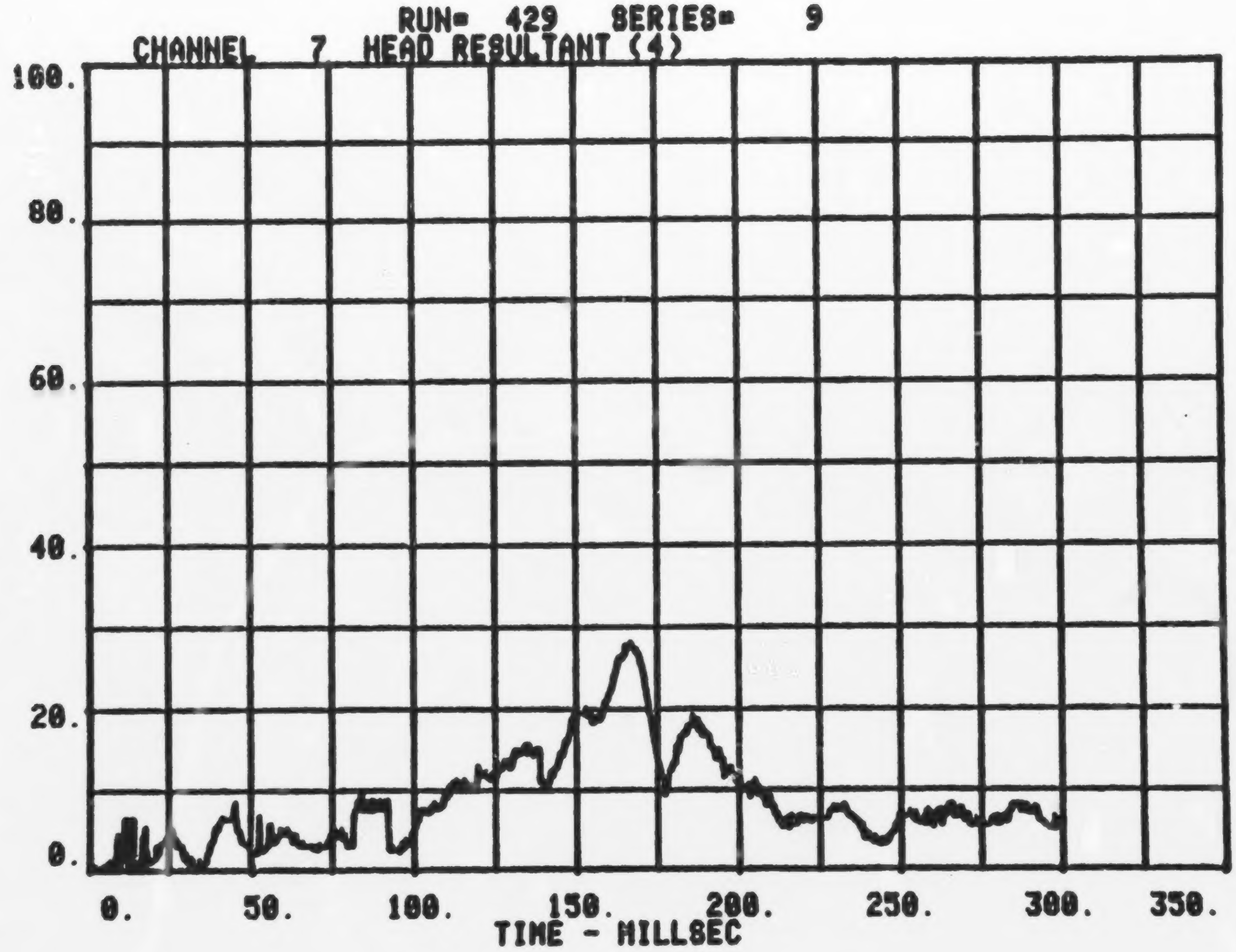
6440-V-5

669

670


RUN= 429 SERIES= 9
CHANNEL 21 HEAD Z(4) G'S
32
24
16
8
0
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5



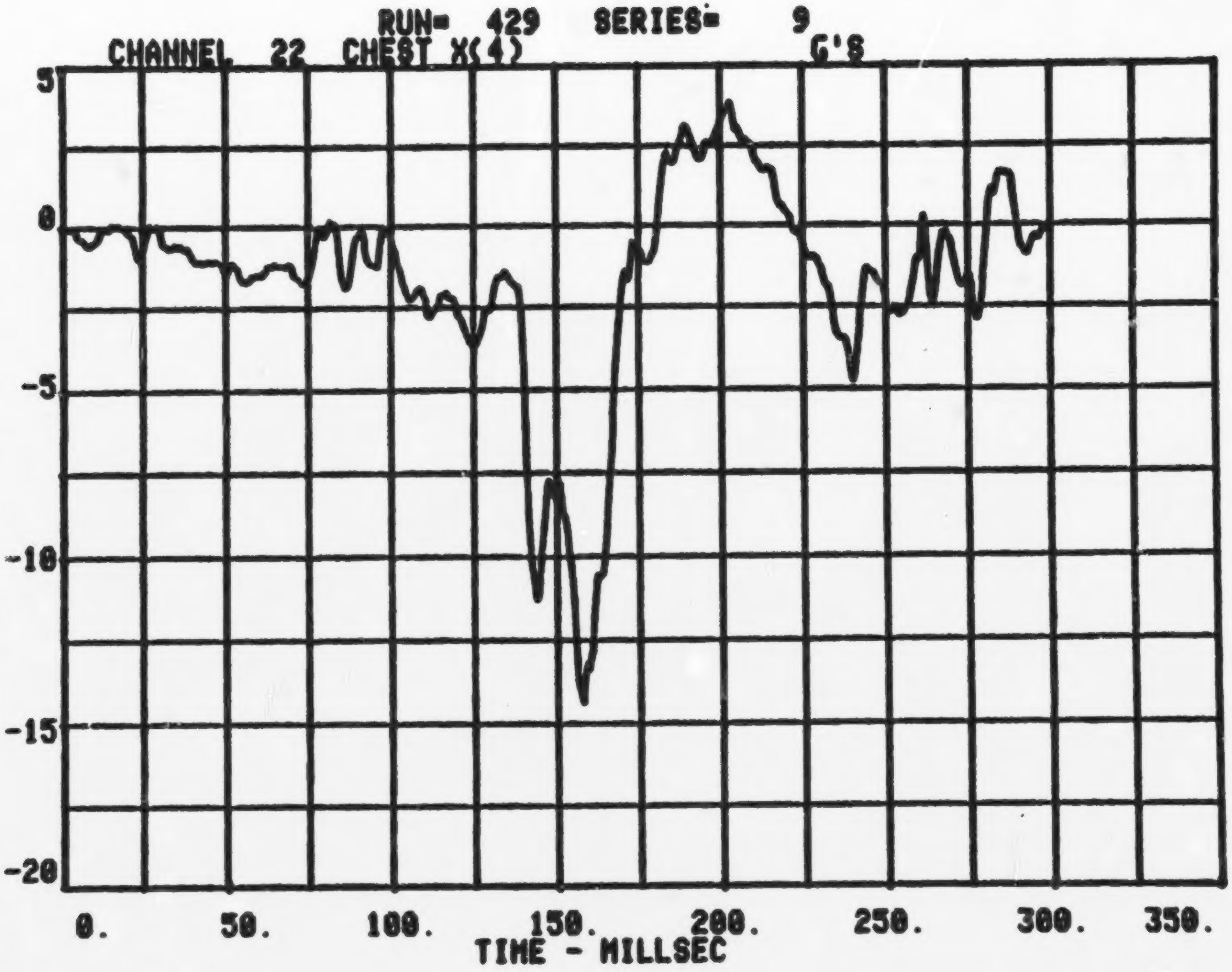
RUN= 429 SERIES= 9

CHANNEL 7 HEAD RESULTANT (4)

6440-V-5

```
                    HEAD INJURY CRITERION
                     HEAD SEVERITY INDEX

              BUS TEST

              RUN= 429

              HEAD RESULTANT (4)

      HIC=  95.0   FROM T1= .11040   TO T2= .20670

      AVERAGE ACCELERATION BETWEEN T1 AND T2=  15.0G'S

      EVENT TIME= 300.0  MSEC

      SEVERITY INDEX= 129.6
```

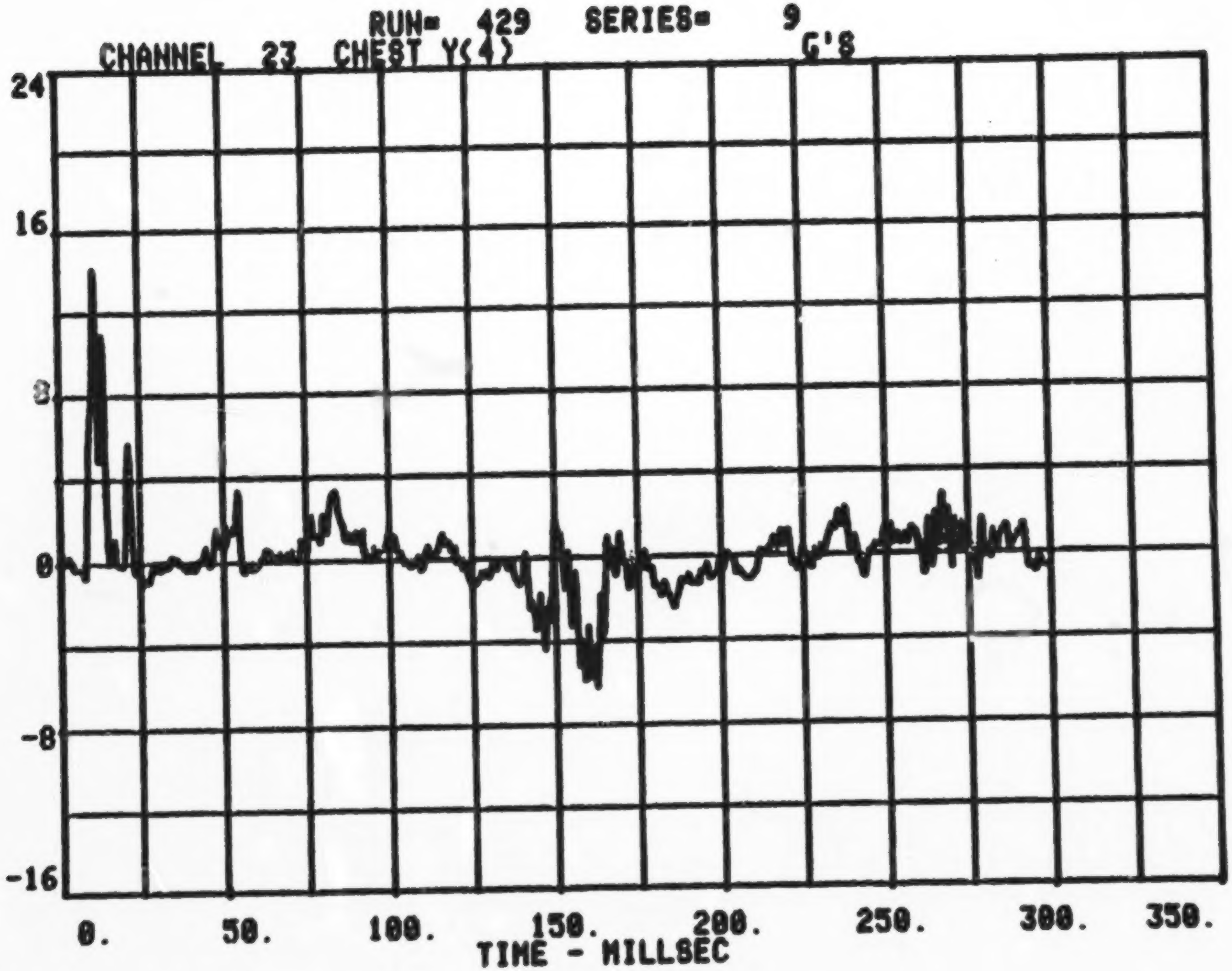
6440-V-5


RUN= 429 SERIES= 9
CHANNEL 22 CHEST X(4)
G'S
5
0
-5
-10
-15
-20
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

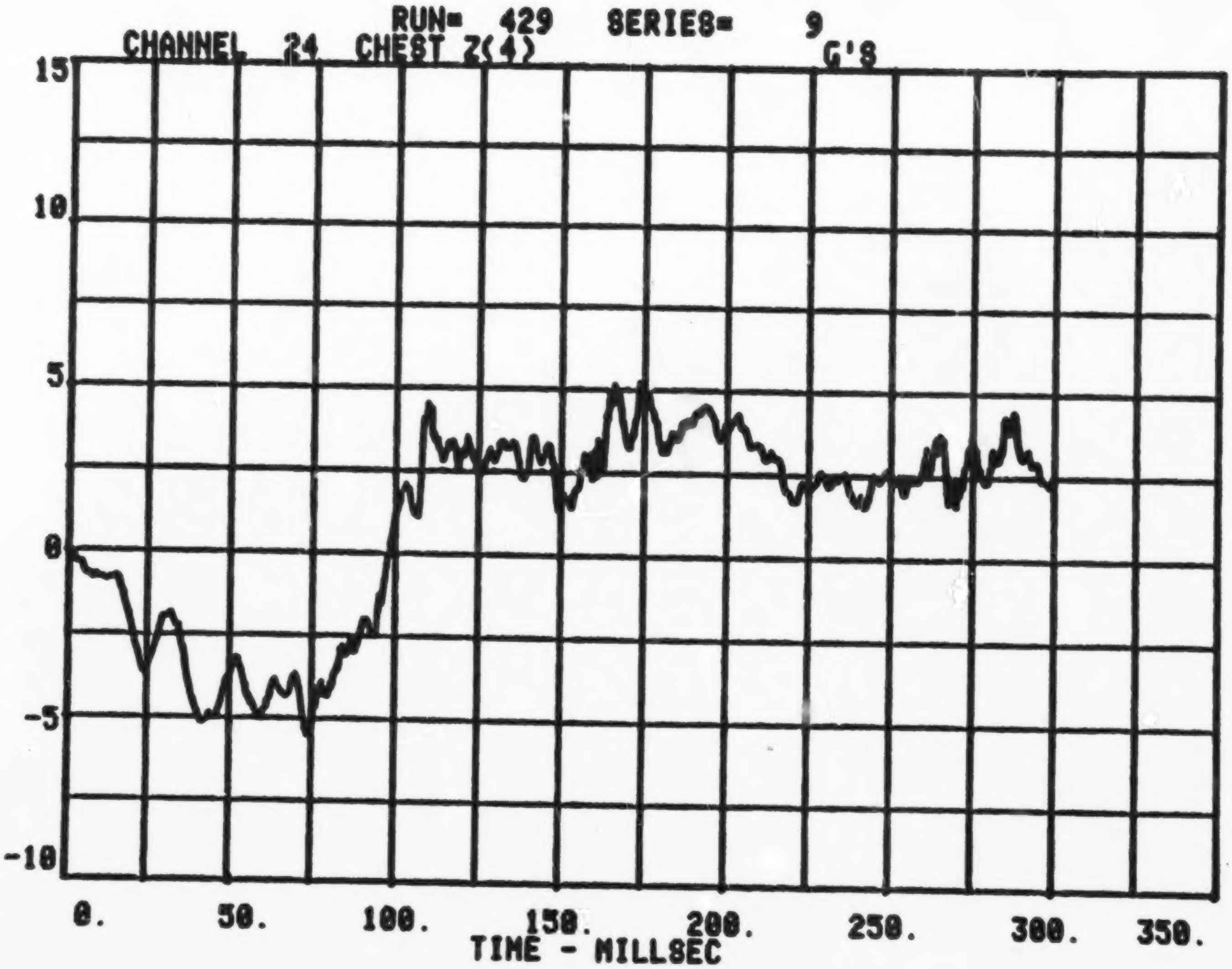
6440-V-5

673

674


RUN= 429 SERIES= 9
CHANNEL 23 CHEST Y(4)
G'S
24
16
8
0
-8
-16
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

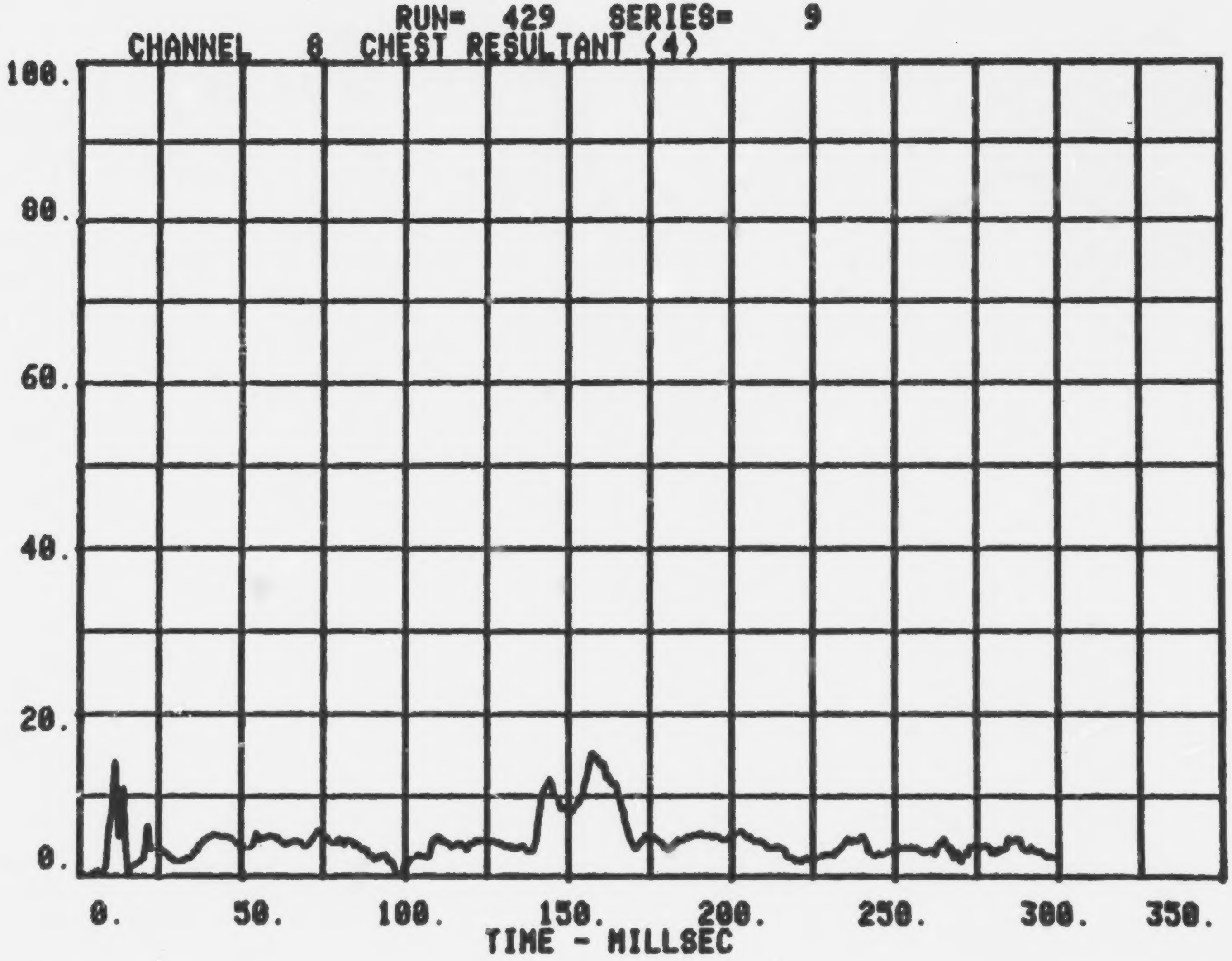
6440-V-5


RUN= 429 SERIES= 9
CHANNEL 24 CHEST Z(4)
G'S
15
10
5
0
-5
-10
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

675

676

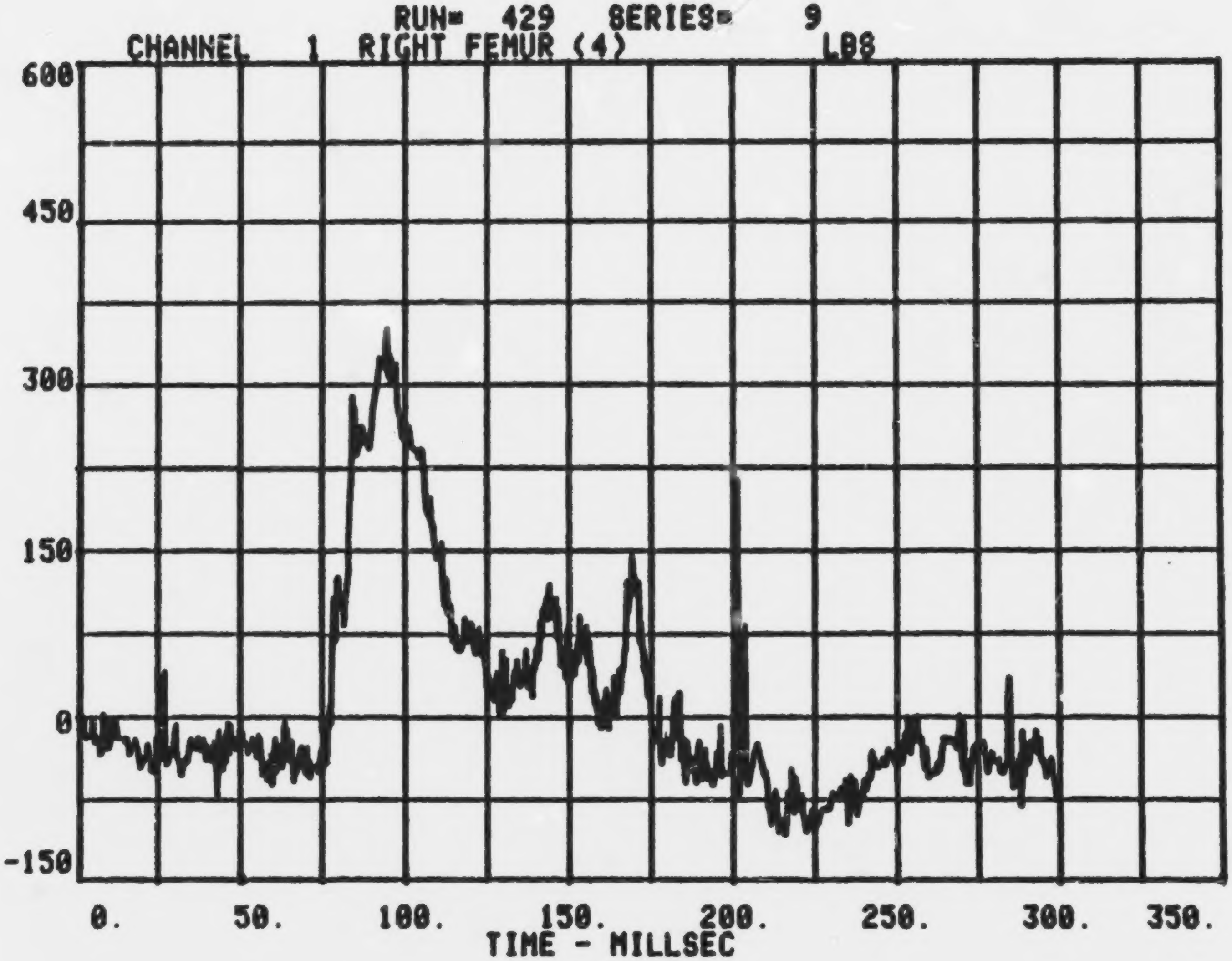

RUN= 429 SERIES= 9

CHANNEL 8 CHEST RESULTANT (4)

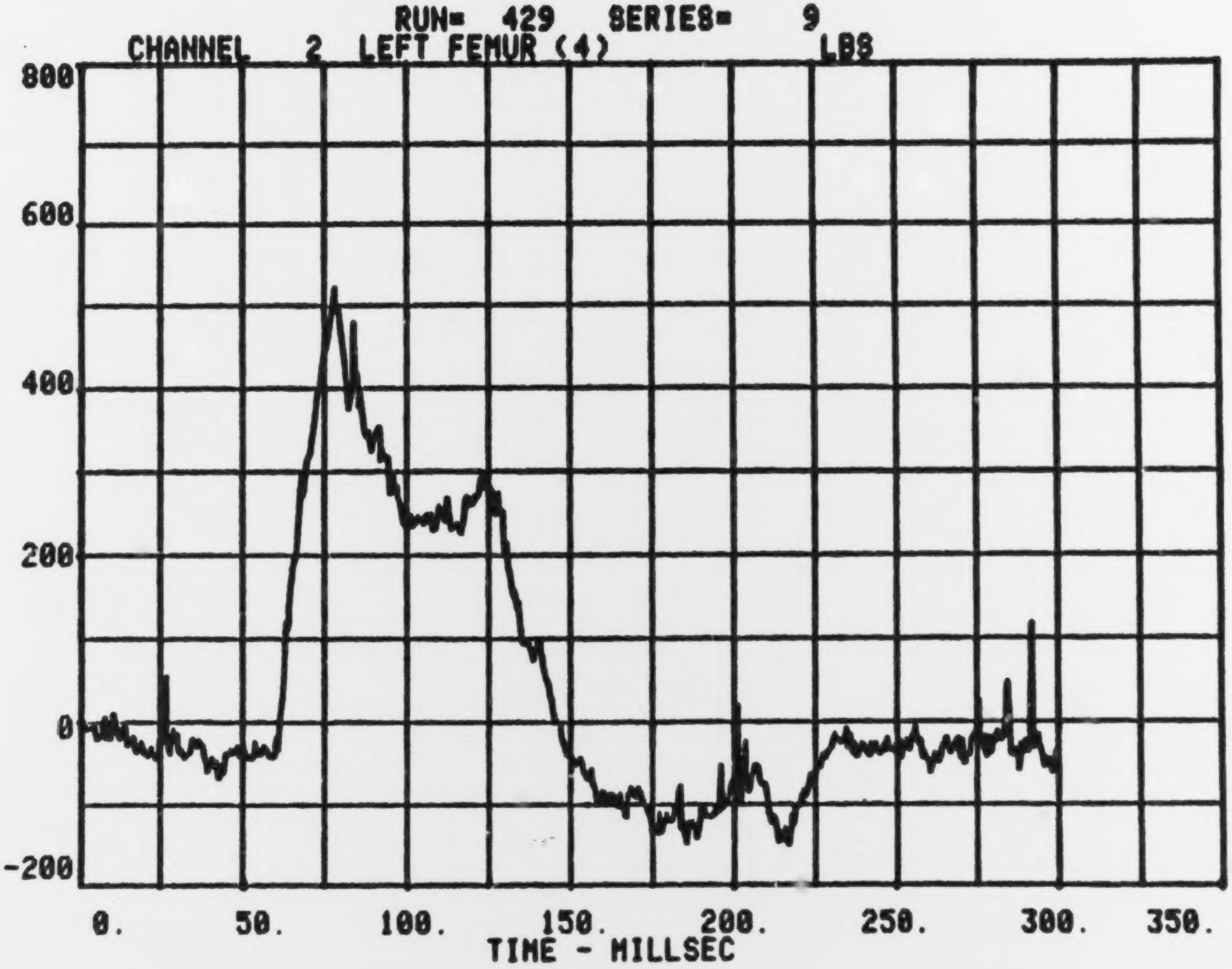
6440-V-5

```
                  HEAD INJURY CRITERION
                   HEAD SEVERITY INDEX

            BUS TEST

            RUN= 429

            CHEST RESULTANT (4)

      HIC=  12.6   FROM T1= .00840   TO T2= .29610 -

      AVERAGE ACCELERATION BETWEEN T1 AND T2=   4.5G'S

      EVENT TIME= 300.0  MSEC

      SEVERITY INDEX=  21.2
```

6440-V-5


RUN= 429 SERIES= 9
CHANNEL 1 RIGHT FEMUR (4) LBS
600
450
300
150
0
-150
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

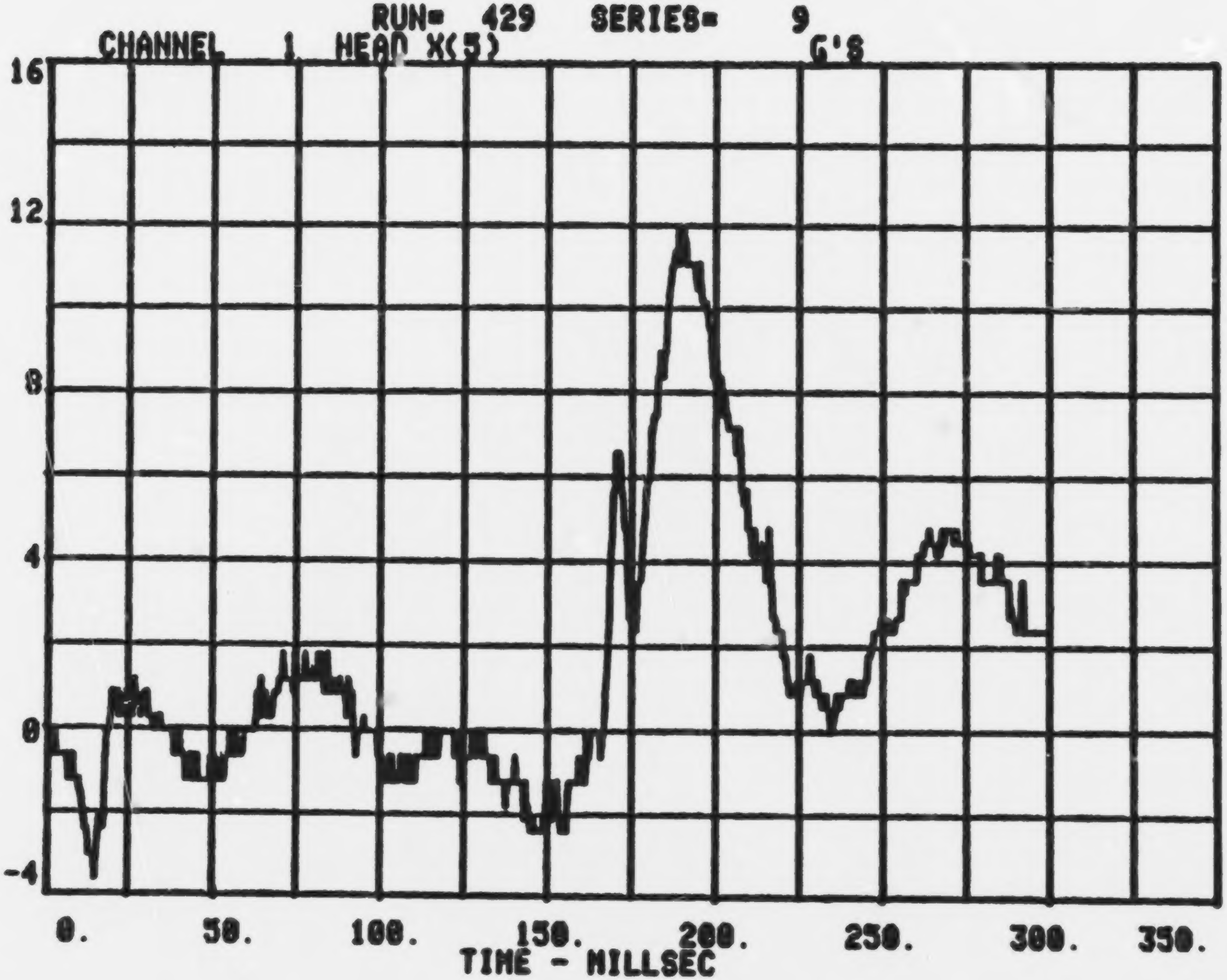
6440-V-5


RUN= 429 SERIES= 9
CHANNEL 2 LEFT FEMUR (4) LBS
800
600
400
200
0
-200
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

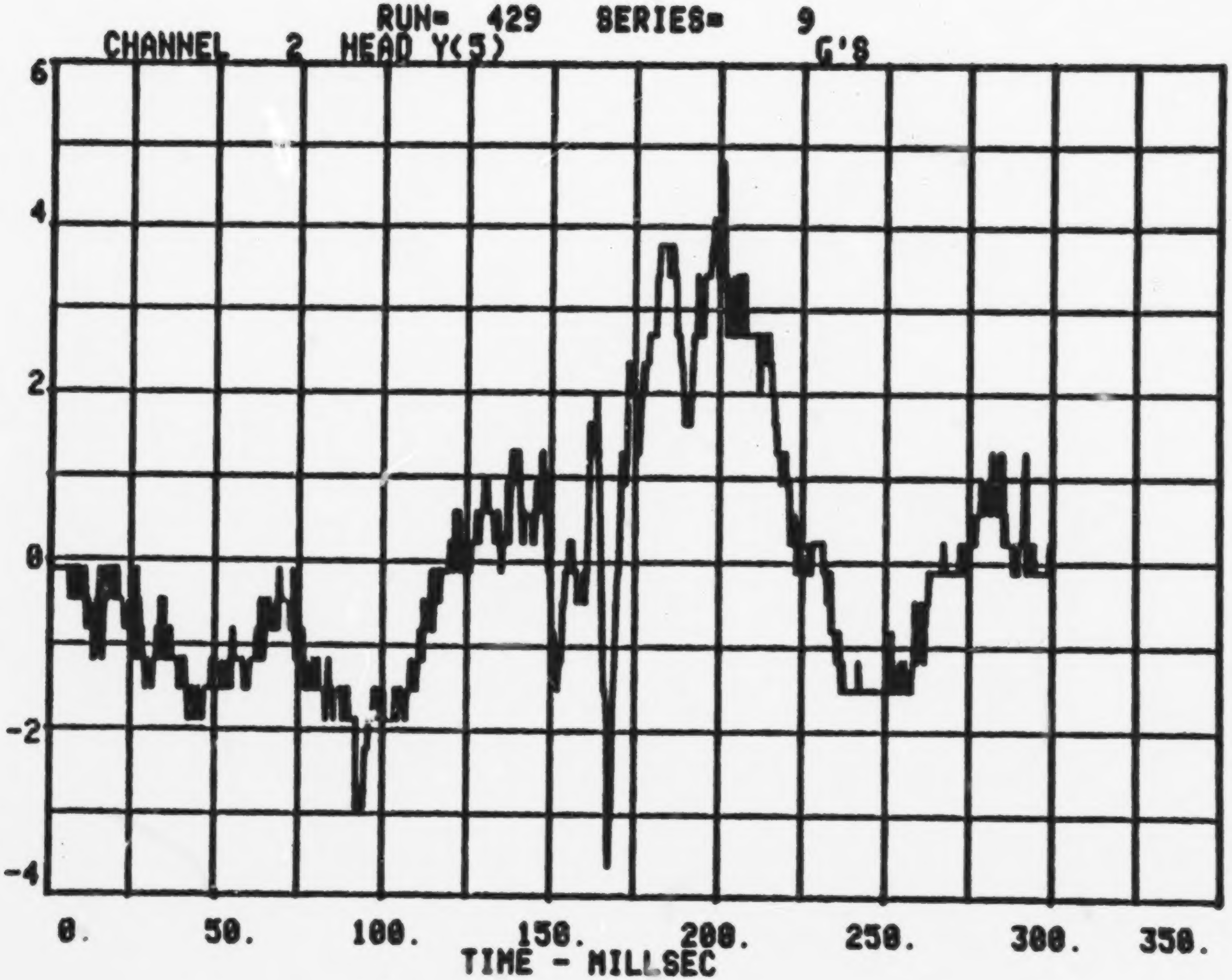
6440-V-5

679

680

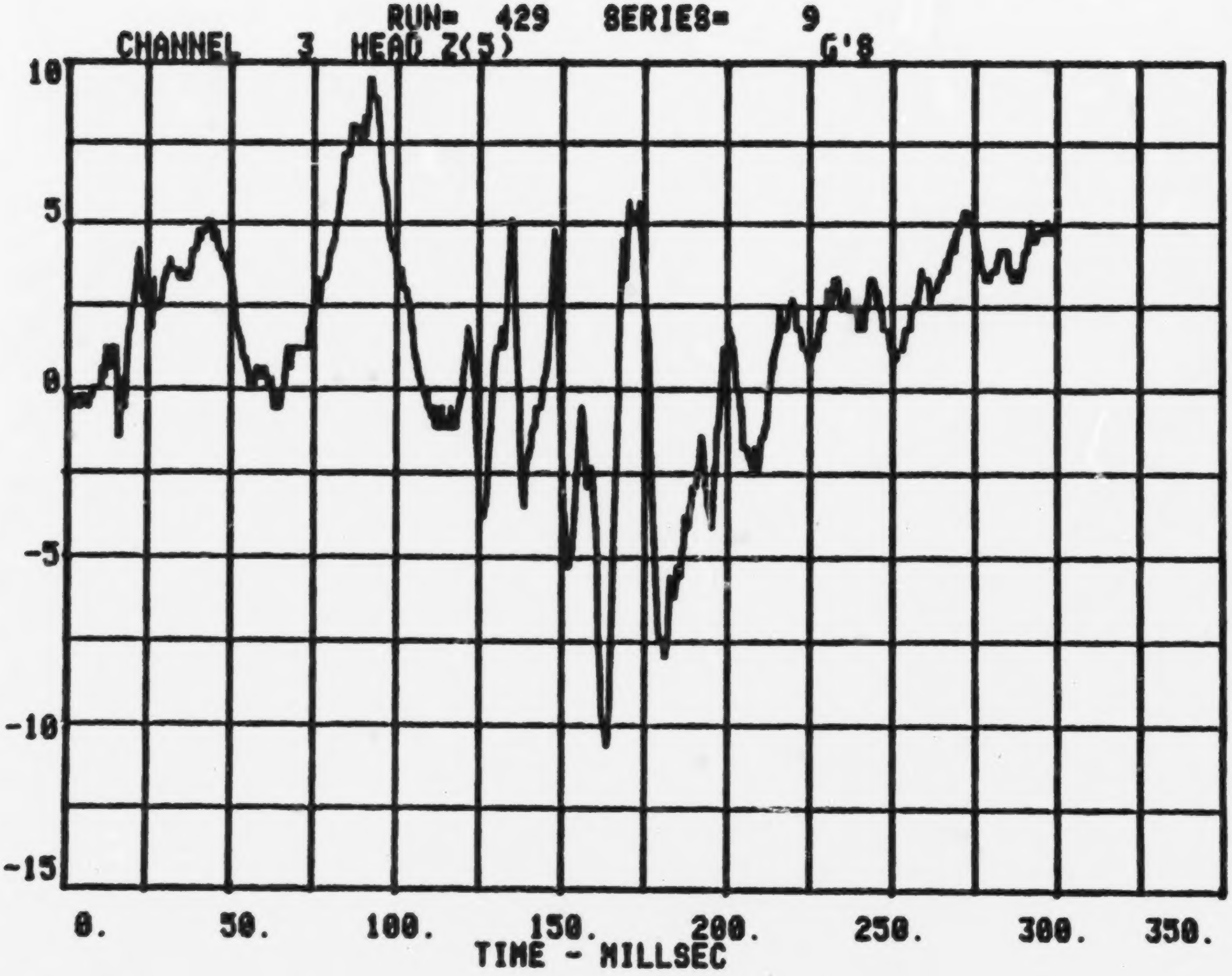

RUN= 429 SERIES= 9
CHANNEL 1 HEAD X(5) G'S
16
12
8
4
0
-4
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

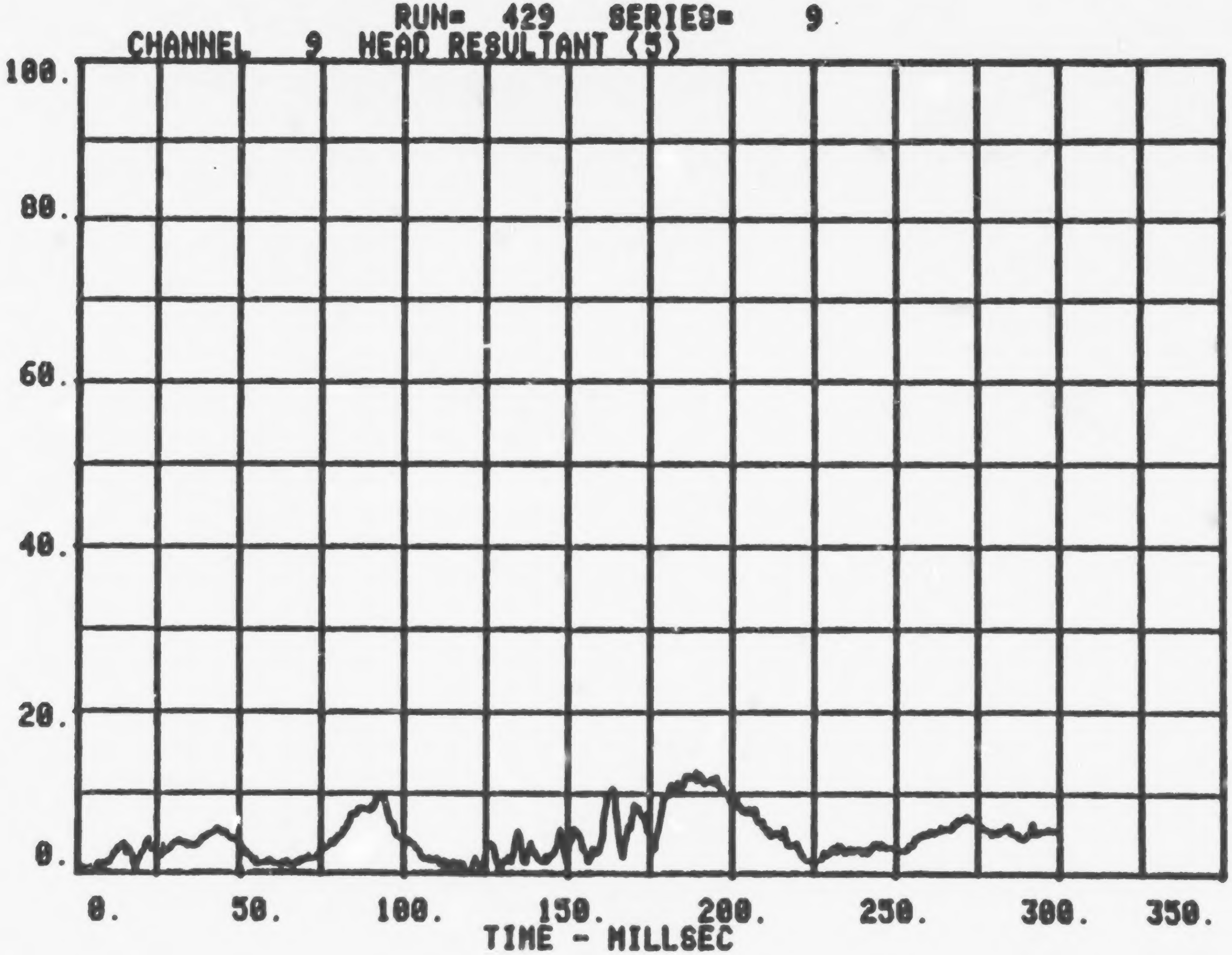

RUN= 429 SERIES= 9
CHANNEL 2 HEAD Y(5)
G'S
6
4
2
0
-2
-4
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

681


RUN= 429 SERIES= 9
CHANNEL 3 HEAD Z(5)
G'S
10
5
0
-5
-10
-15
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5


RUN= 429 SERIES= 9
CHANNEL 9 HEAD RESULTANT (5)
100.
80.
60.
40.
20.
0.
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

683

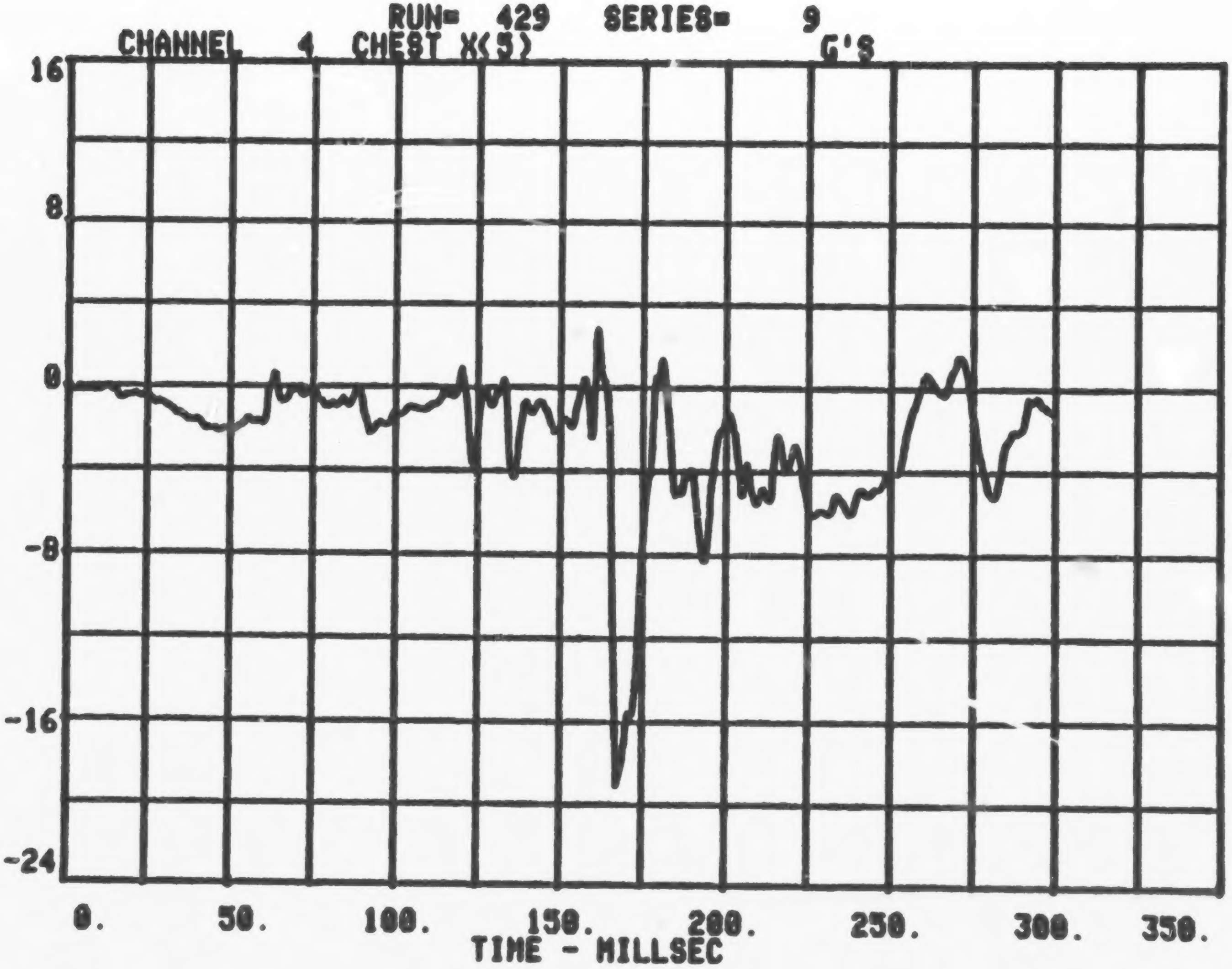
6440-V-5

684

HEAD INJURY CRITERION
HEAD SEVERITY INDEX

```
BUS TEST

RUN= 429

HEAD RESULTANT (5)

HIC=  13.1   FROM T1= .01980   TO T2= .29970

AVERAGE ACCELERATION BETWEEN T1 AND T2=   4.7G'S

EVENT TIME= 300.0  MSEC

SEVERITY INDEX=  23.0
```

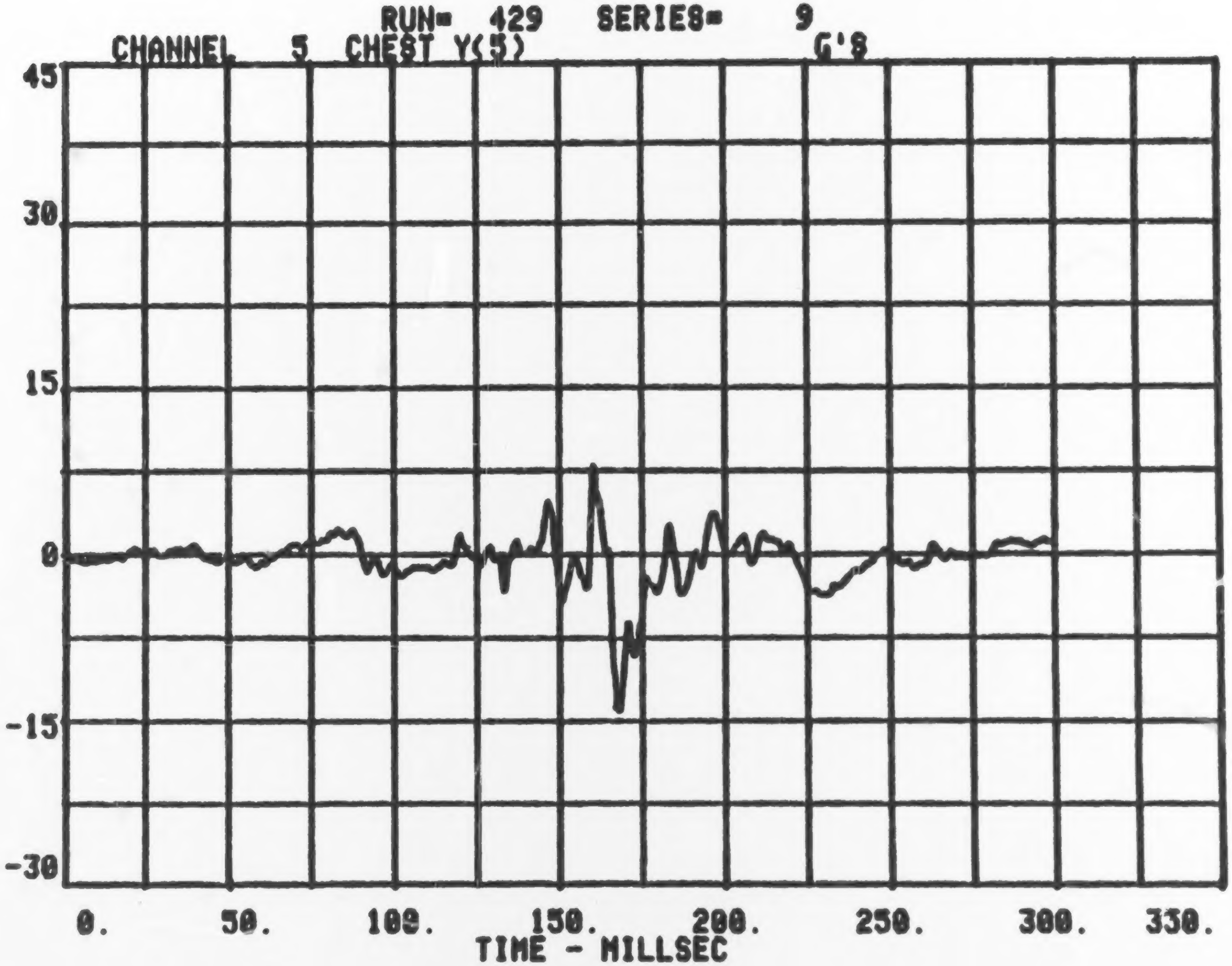
6440-V-5


RUN= 429 SERIES= 9
CHANNEL 4 CHEST X(5) G'S
16
8
0
-8
-16
-24
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

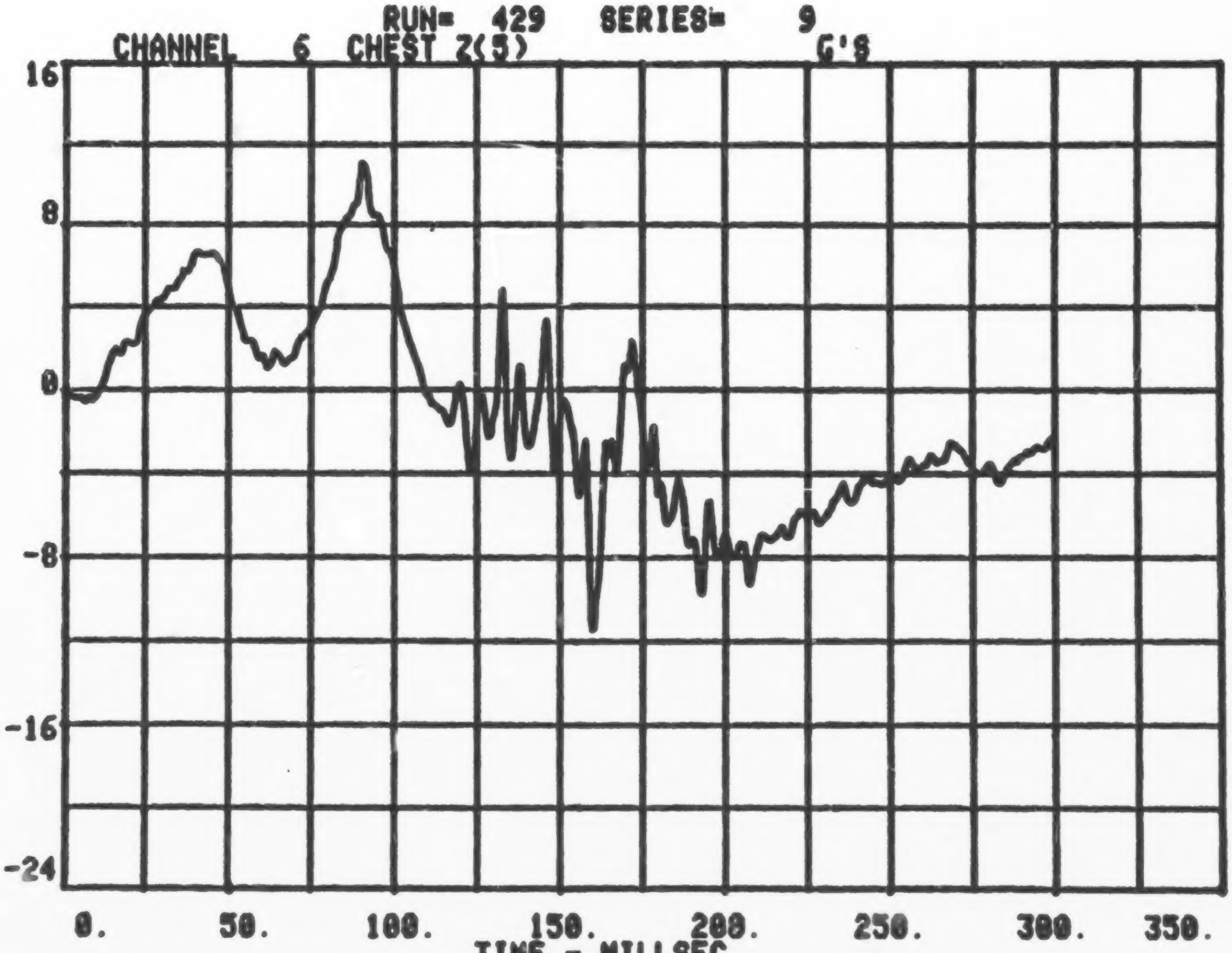
6440-V-5

685

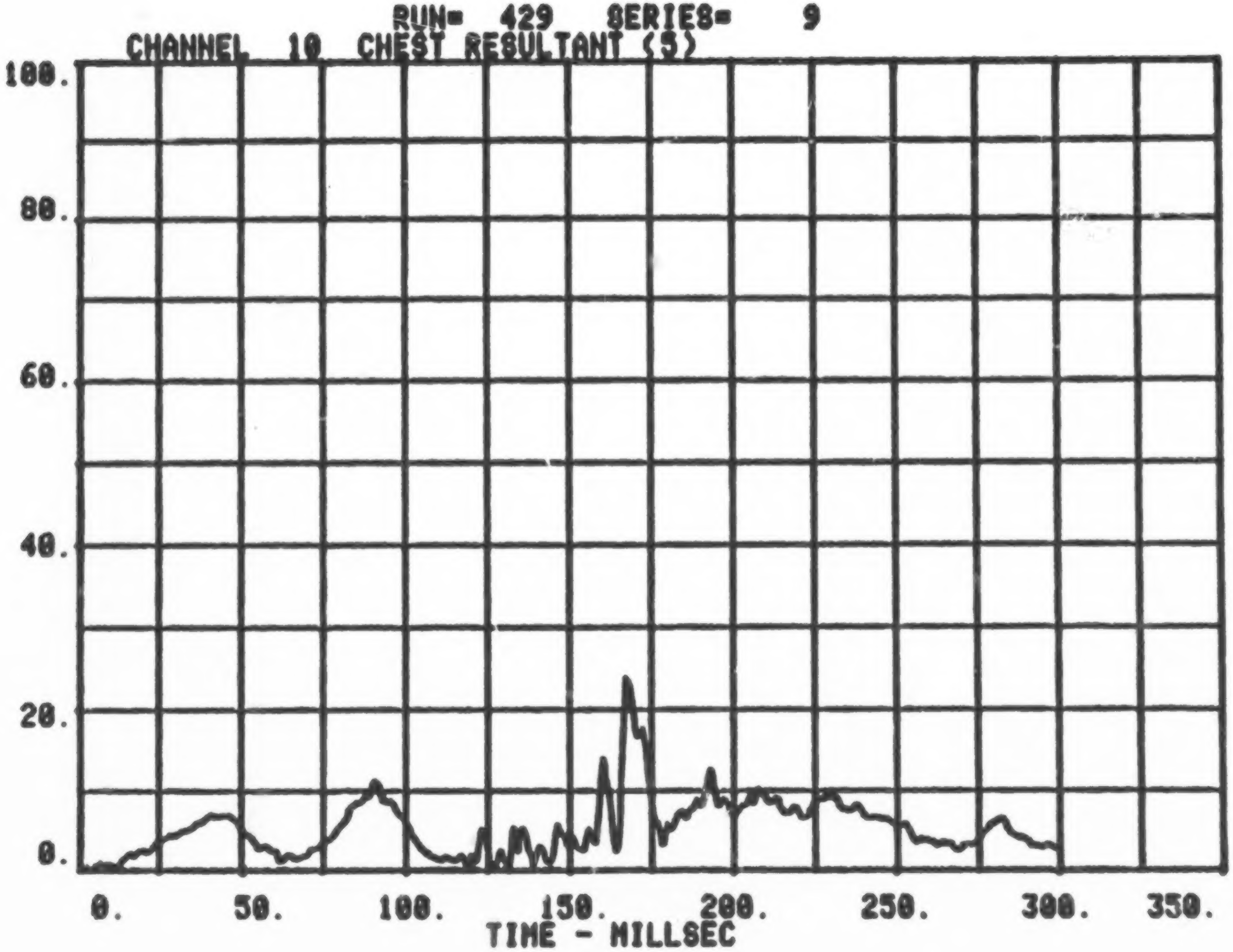
686


RUN= 429 SERIES= 9
CHANNEL 5 CHEST Y(5) G'S
45
30
15
0
-15
-30
0.
50.
100.
150.
200.
250.
300.
330.
TIME - MILLSEC

6440-V-5


RUN= 429 SERIES= 9
CHANNEL 6 CHEST Z(5) G'S
16
8
0
-8
-16
-24
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

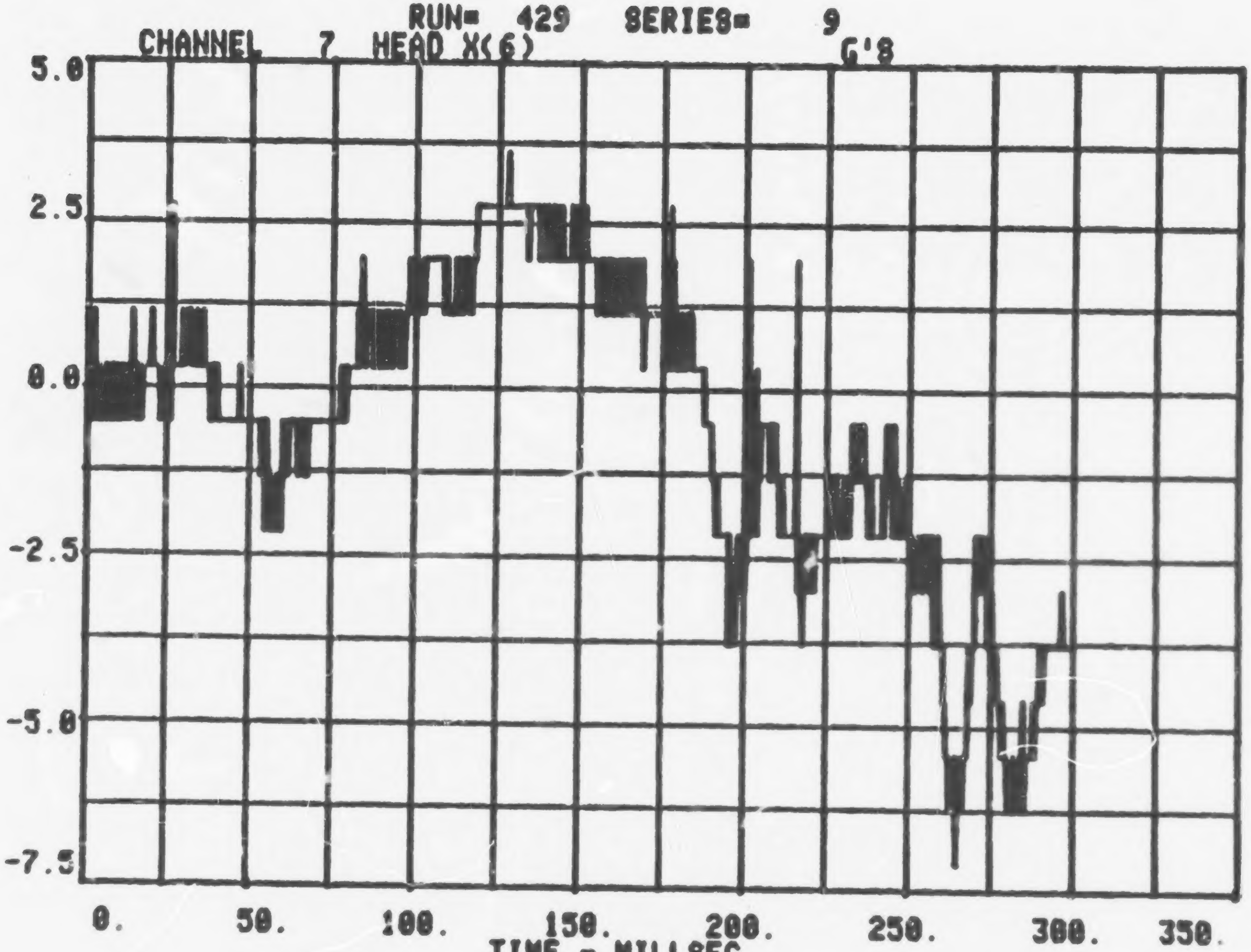
688


RUN= 429 SERIES= 9
CHANNEL 10 CHEST RESULTANT (5)
100.
80.
60.
40.
20.
0.
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

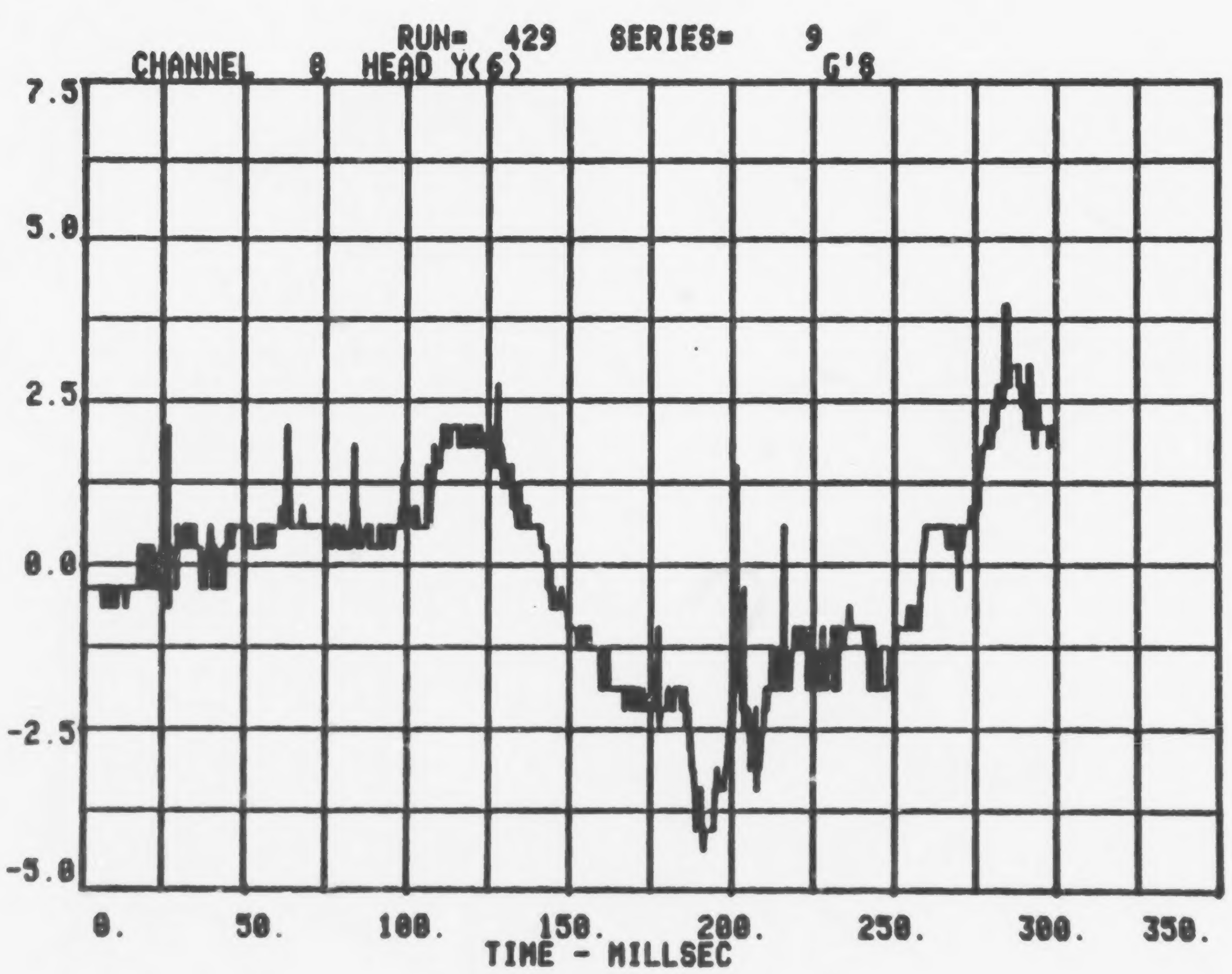
6440-V-5

```
                    HEAD INJURY CRITERION
                     HEAD SEVERITY INDEX

                BUS TEST

                RUN= 429

                CHEST RESULTANT (5)

        HIC=  21.8   FROM T1= .02310   TO T2= .29160

        AVERAGE ACCELERATION BETWEEN T1 AND T2=   5.8G'S

        EVENT TIME= 300.0  MSEC

        SEVERITY INDEX=  39.4
```

690

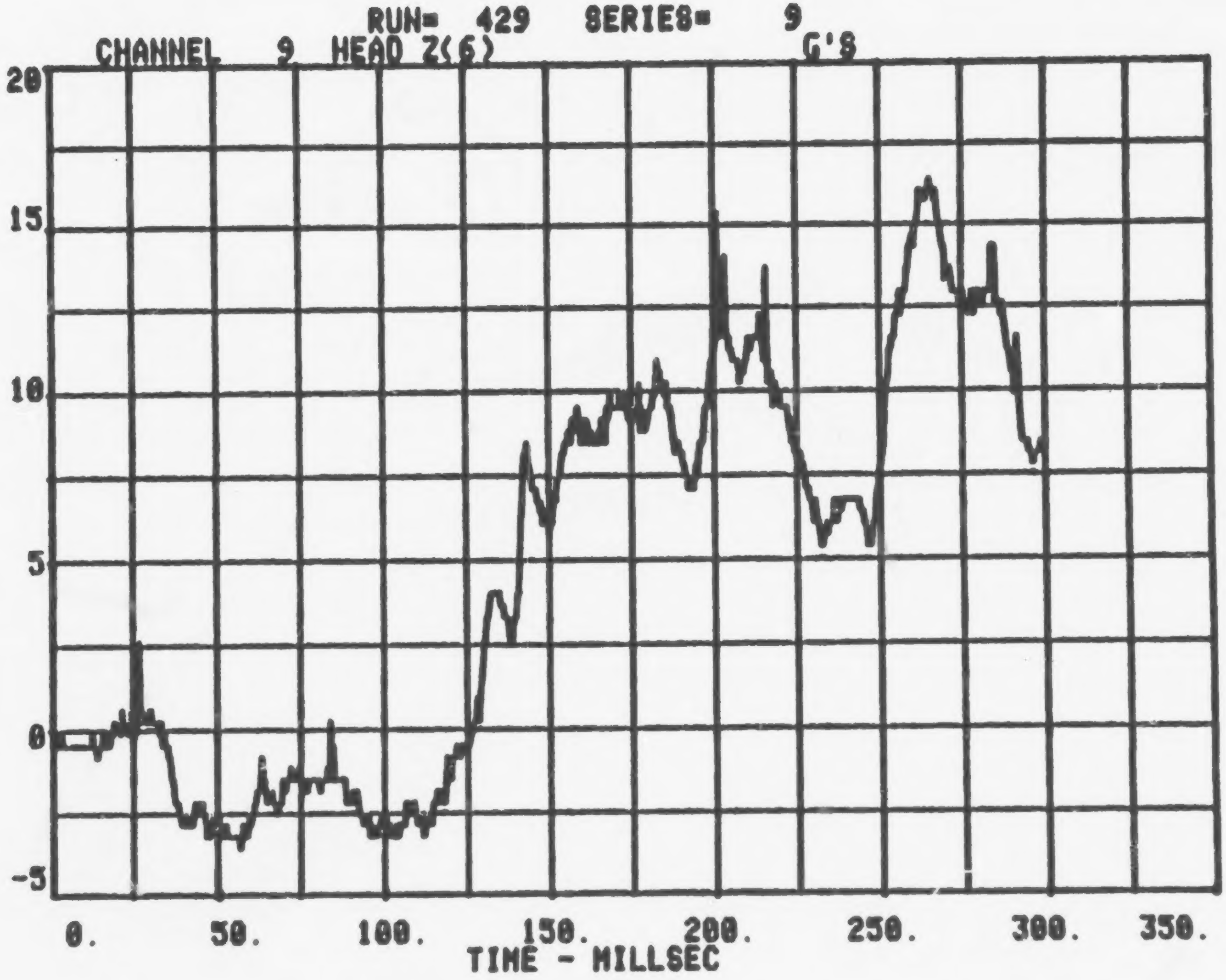

RUN= 429 SERIES= 9
CHANNEL 7 HEAD X(6)
G'S
5.0
2.5
0.0
-2.5
-5.0
-7.5
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

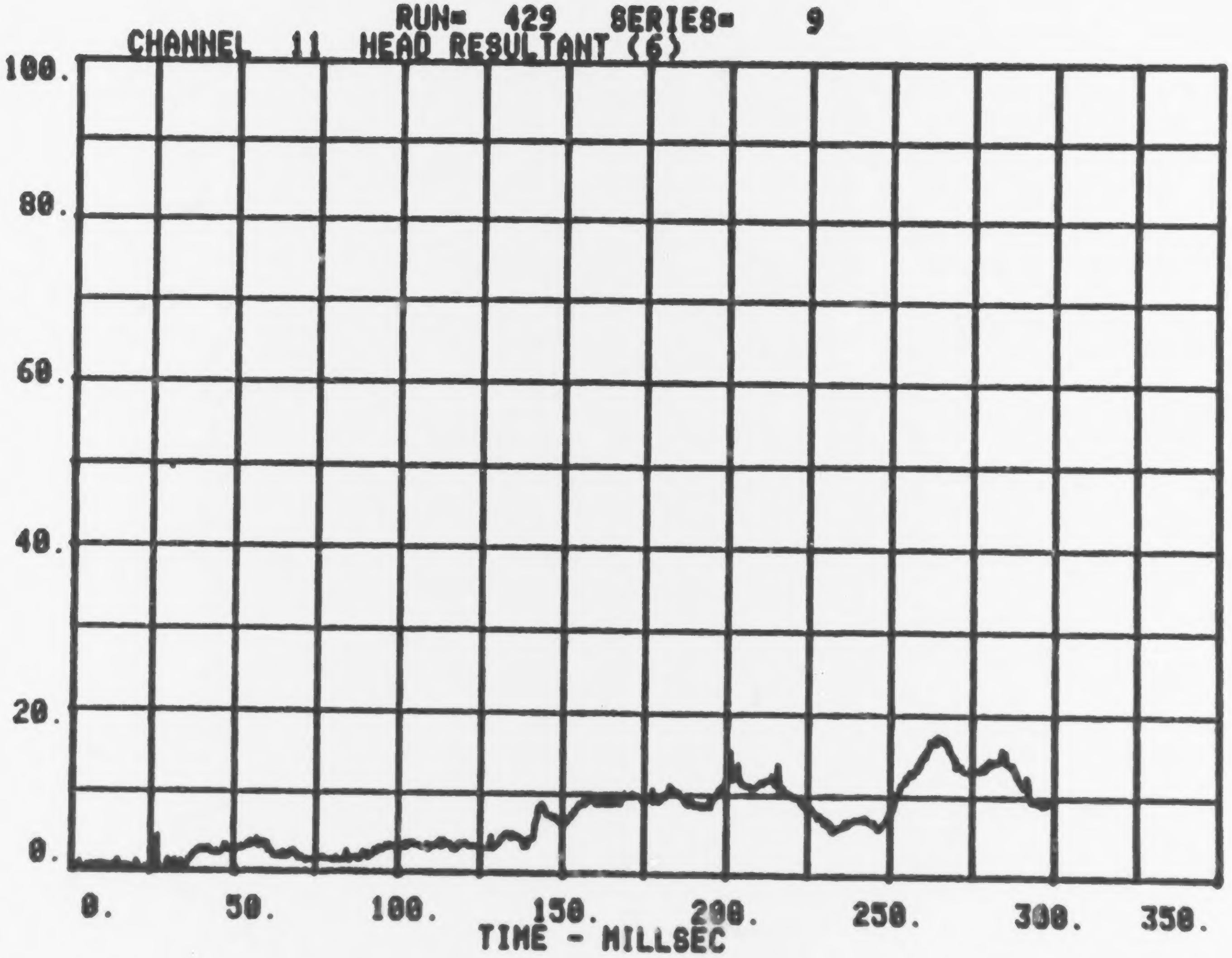

RUN= 429 SERIES= 9
CHANNEL 8 HEAD Y(6) G'S
7.5
5.0
2.5
0.0
-2.5
-5.0
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

692


RUN= 429 SERIES= 9
CHANNEL 9 HEAD Z(6)
G'S
20
15
10
5
0
-5
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

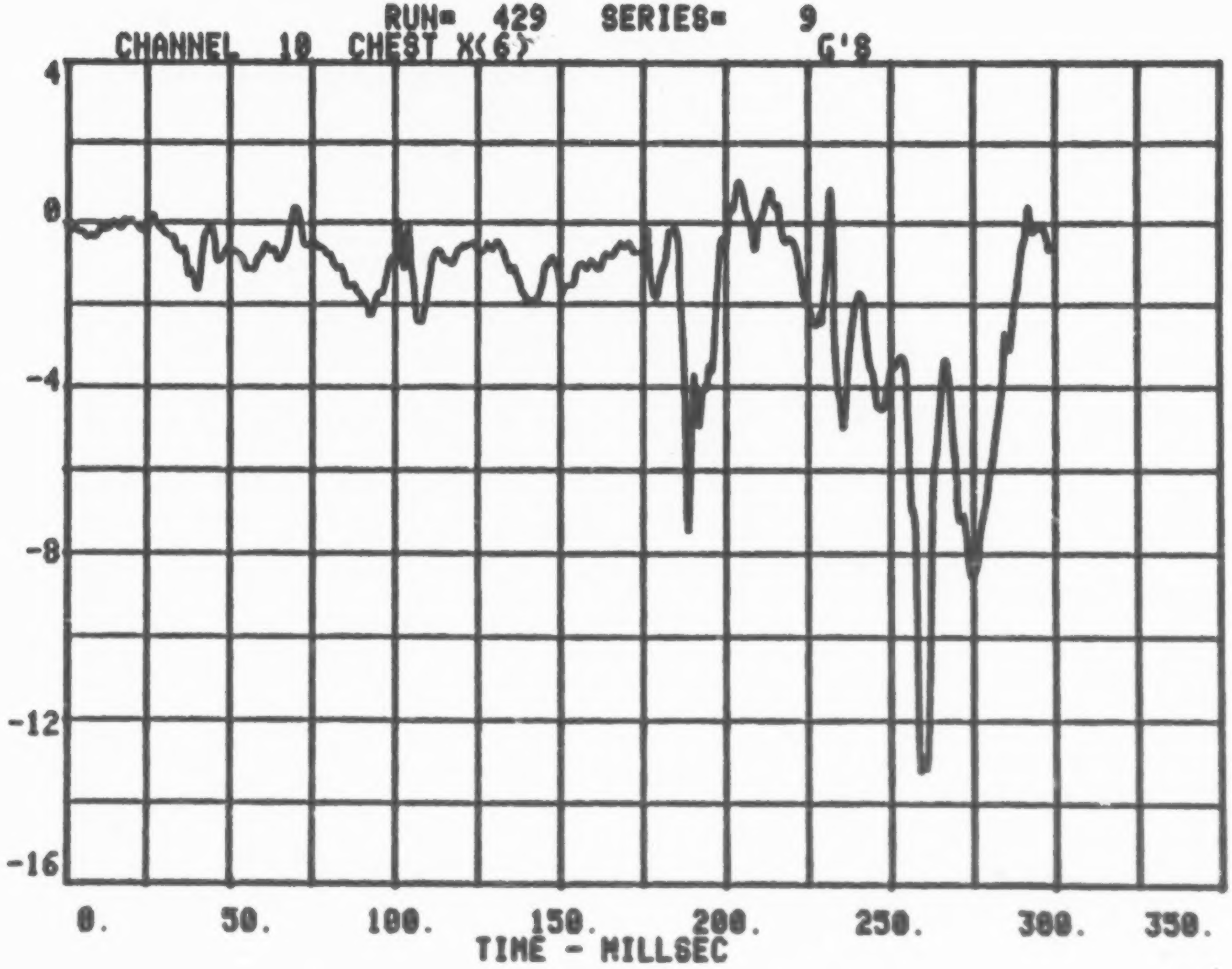

RUN= 429 SERIES= 9
CHANNEL 11 HEAD RESULTANT (6)
100.
80.
60.
40.
20.
0.
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

693

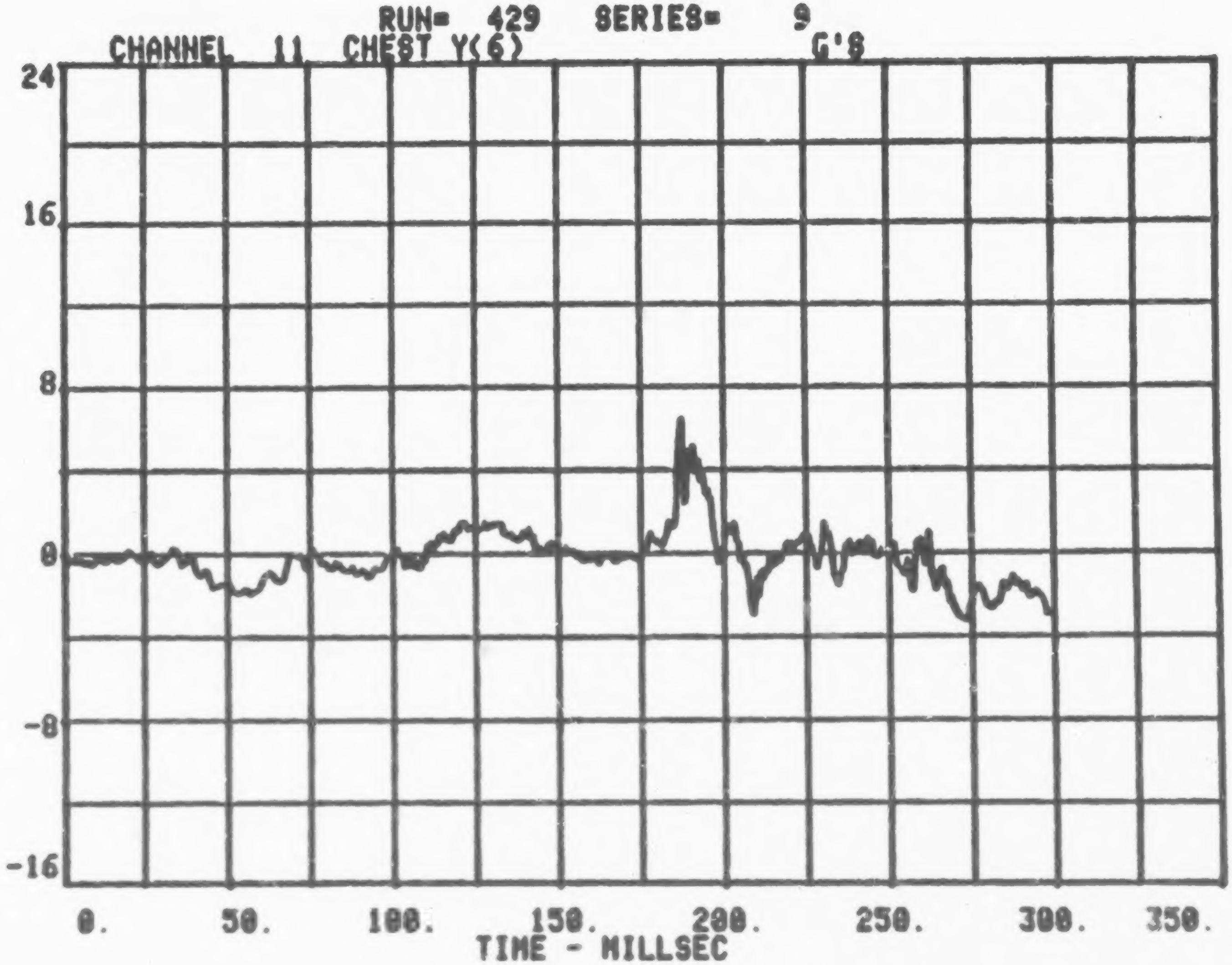
HEAD INJURY CRITERION
HEAD SEVERITY INDEX

```
BUS TEST

RUN= 429

HEAD RESULTANT (6)

HIC=  54.9   FROM T1= .14160   TO T2= .29970

AVERAGE ACCELERATION BETWEEN T1 AND T2=  10.4G'S

EVENT TIME= 300.0  MSEC

SEVERITY INDEX=  64.5
```

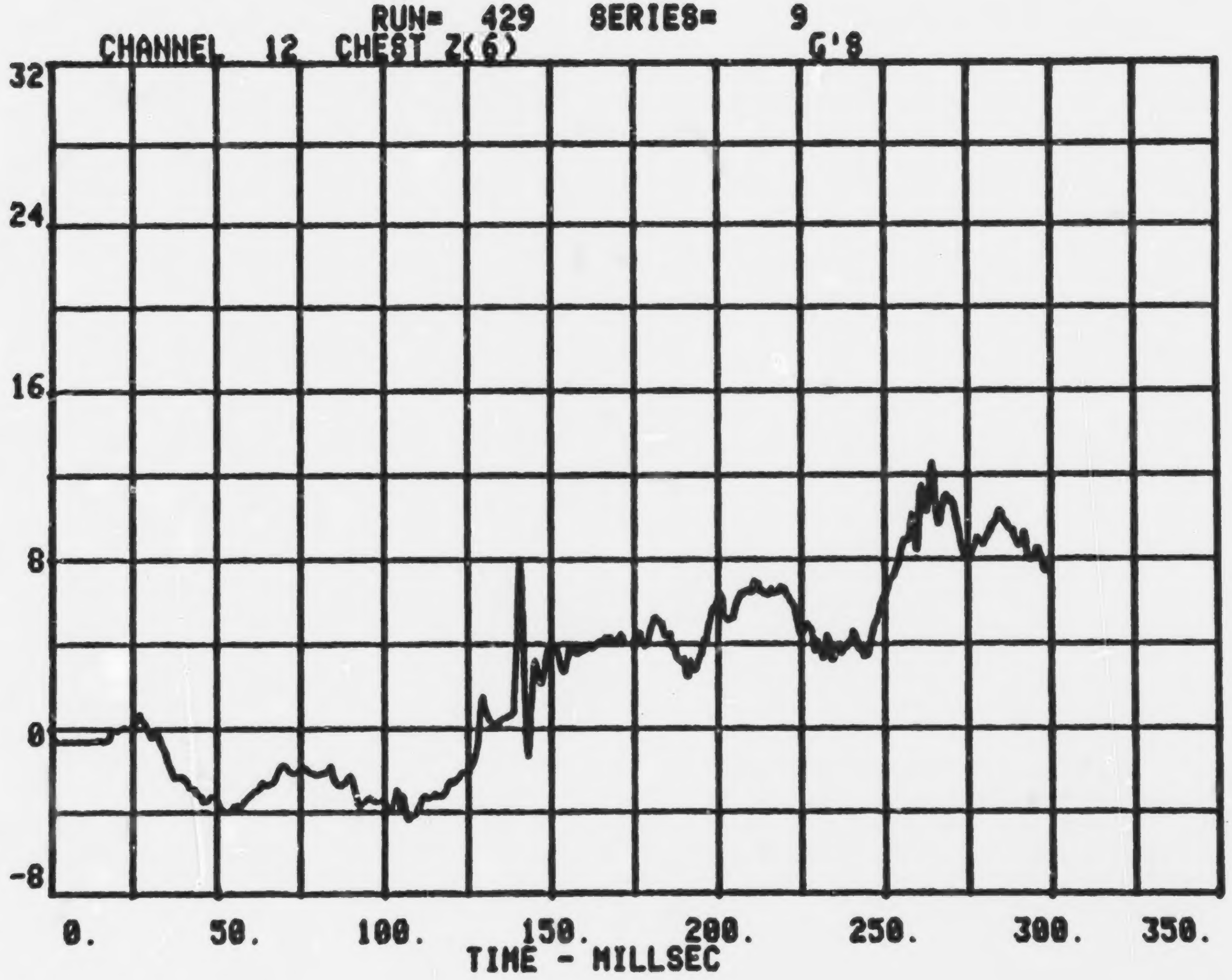

RUN= 429 SERIES= 9
CHANNEL 10 CHEST X(6)
G'S
4
0
-4
-8
-12
-16
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

695


RUN= 429 SERIES= 9
CHANNEL 11 CHEST Y(6)
G'S
24
16
8
0
-8
-16
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

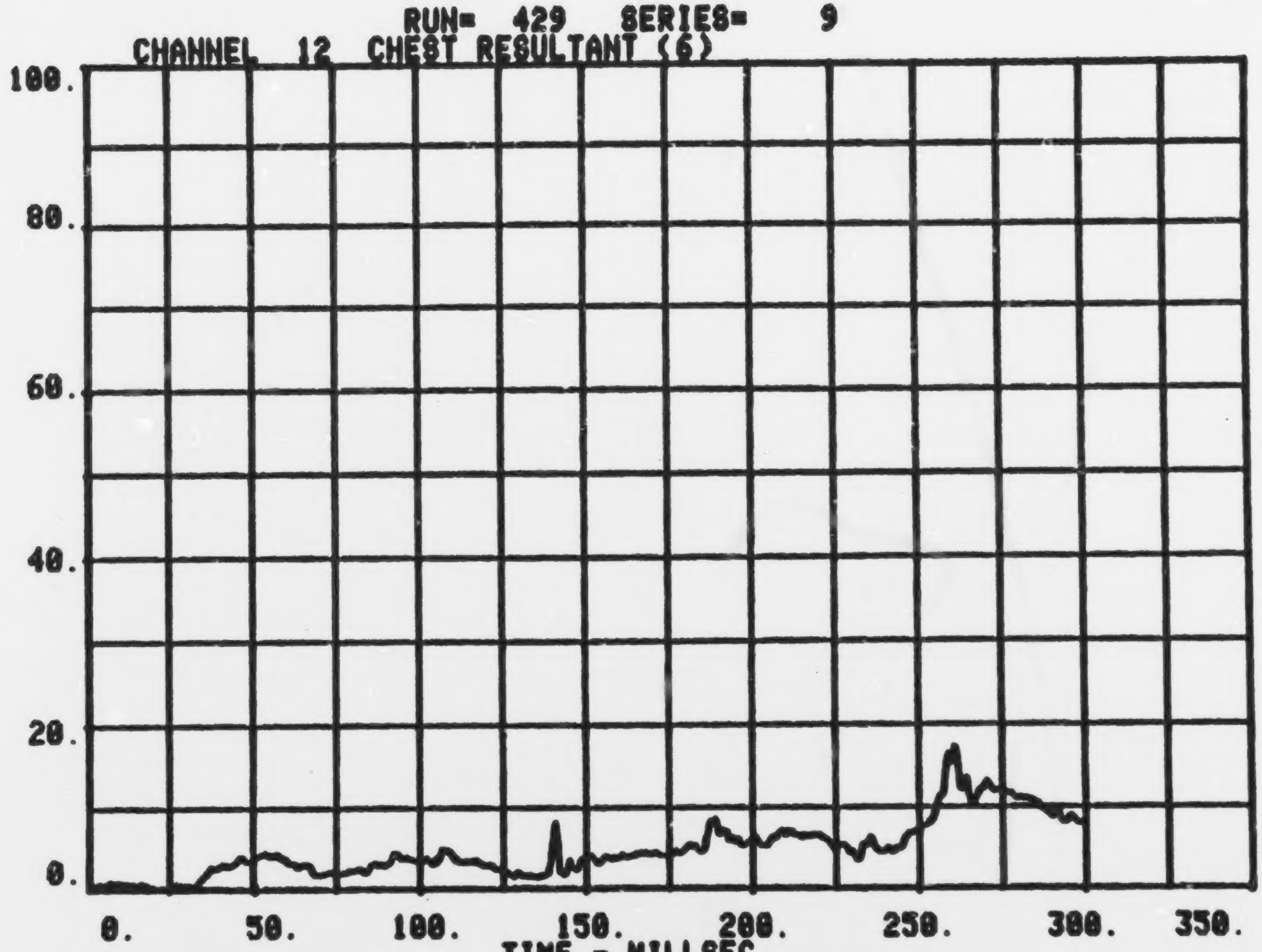
6440-V-5


RUN= 429 SERIES= 9
CHANNEL 12 CHEST Z(6) G'S
32
24
16
8
0
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

697

698



RUN= 429 SERIES= 9
CHANNEL 12 CHEST RESULTANT (G)
100.
80.
60.
40.
20.
0.
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

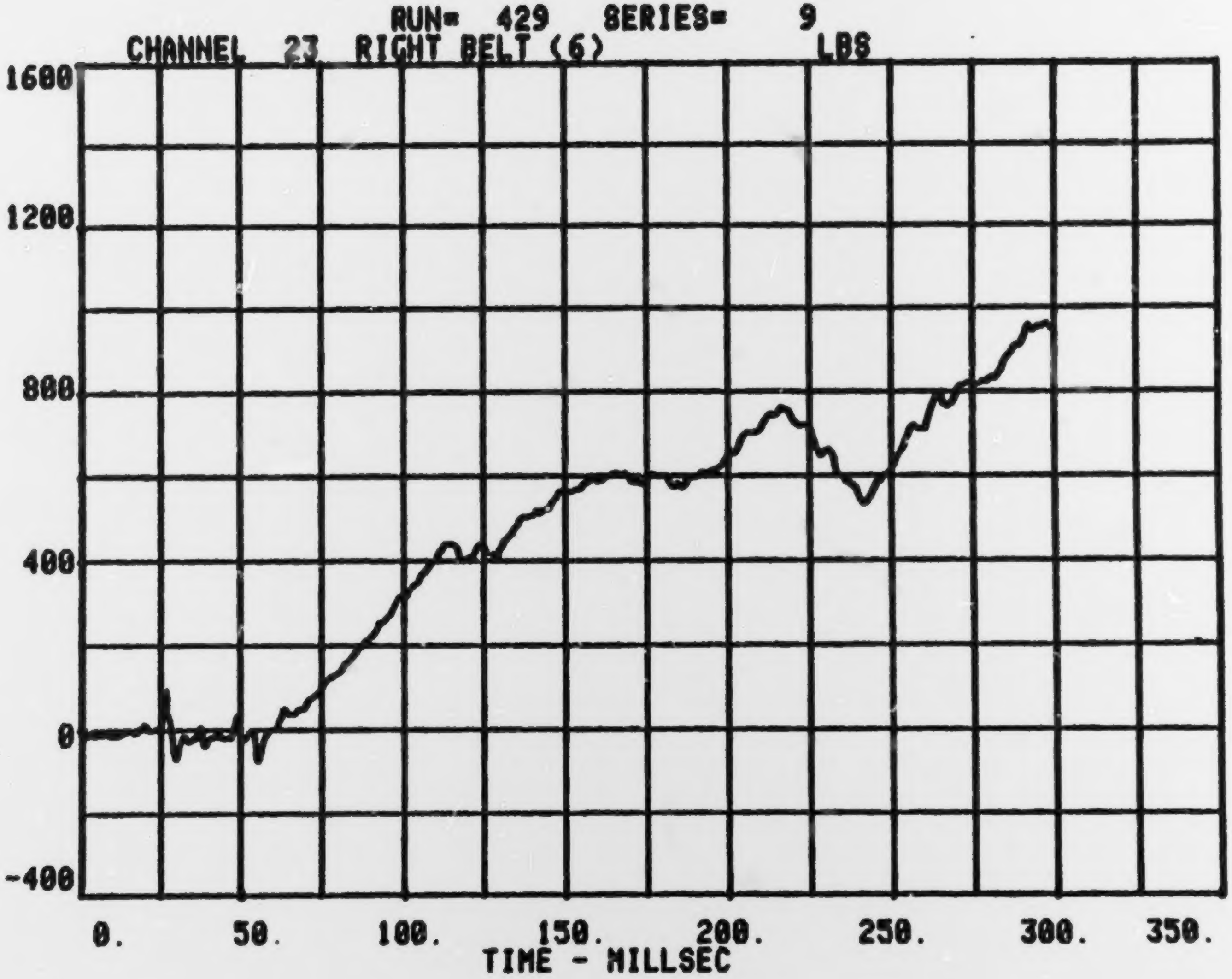
6440-V-5

```
                 HEAD INJURY CRITERION
                 HEAD SEVERITY INDEX

             BUS TEST

             RUN= 429

             CHEST RESULTANT (6)

      HIC=  21.7   FROM T1= .17940   TO T2= .29970

      AVERAGE ACCELERATION BETWEEN T1 AND T2=   8.8G'S

      EVENT TIME= 300.0  MSEC

      SEVERITY INDEX=  31.1
```

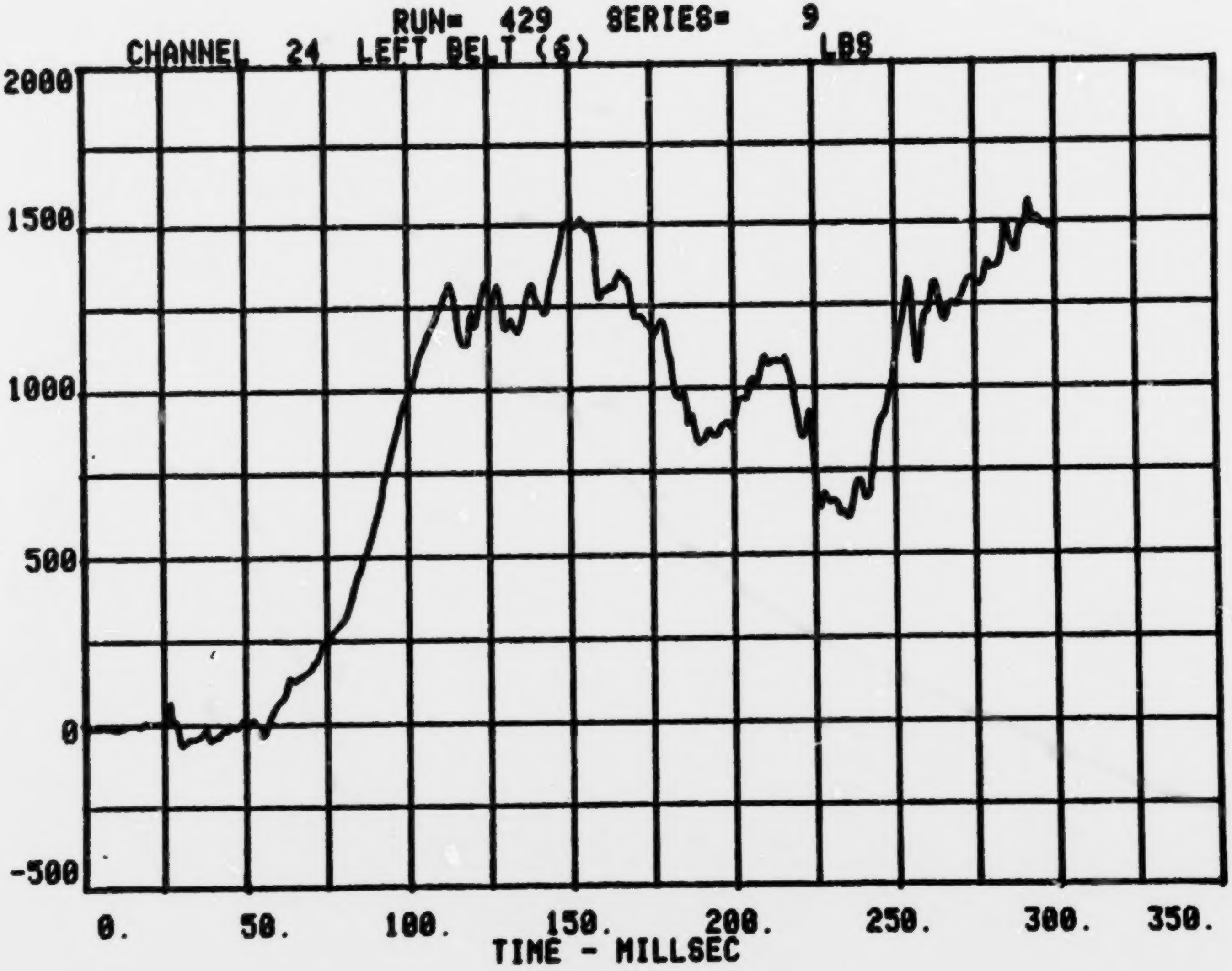
6440-V-5

699

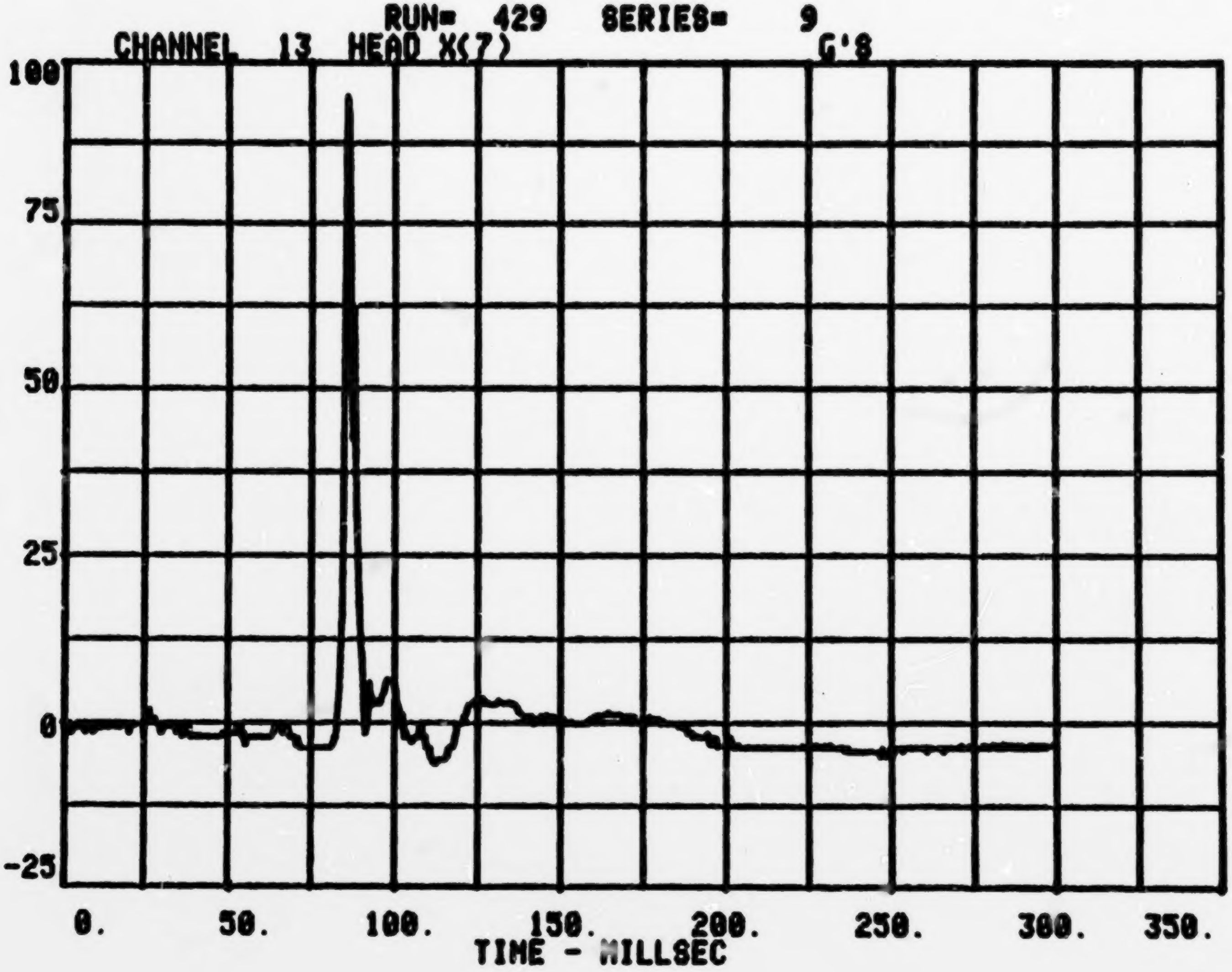
700


RUN= 429 SERIES= 9
CHANNEL 23 RIGHT BELT (6) LBS
1600
1200
800
400
0
-400
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

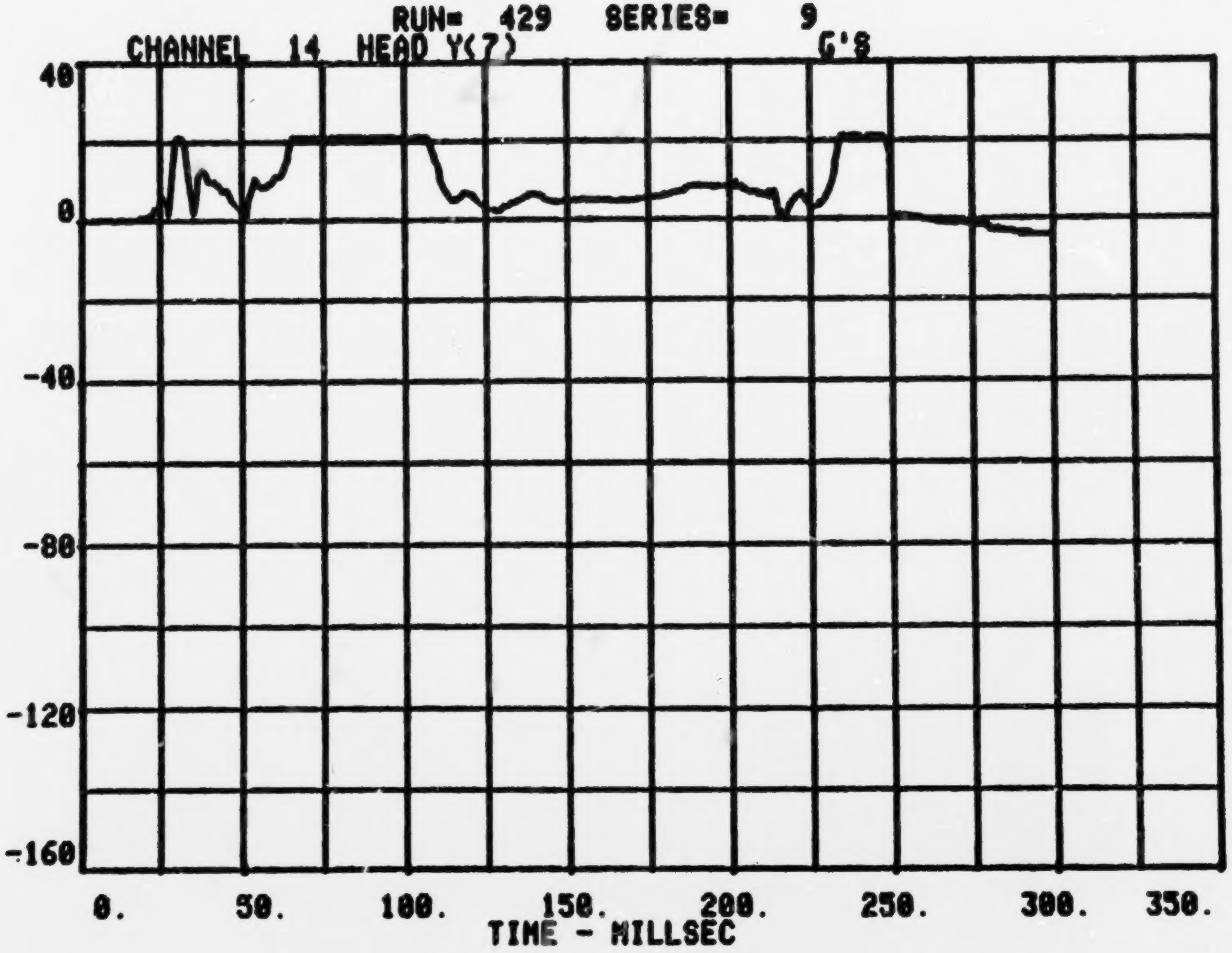
6440-V-5


RUN= 429 SERIES= 9
CHANNEL 24 LEFT BELT (6)
LBS
2000
1500
1000
500
0
-500
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

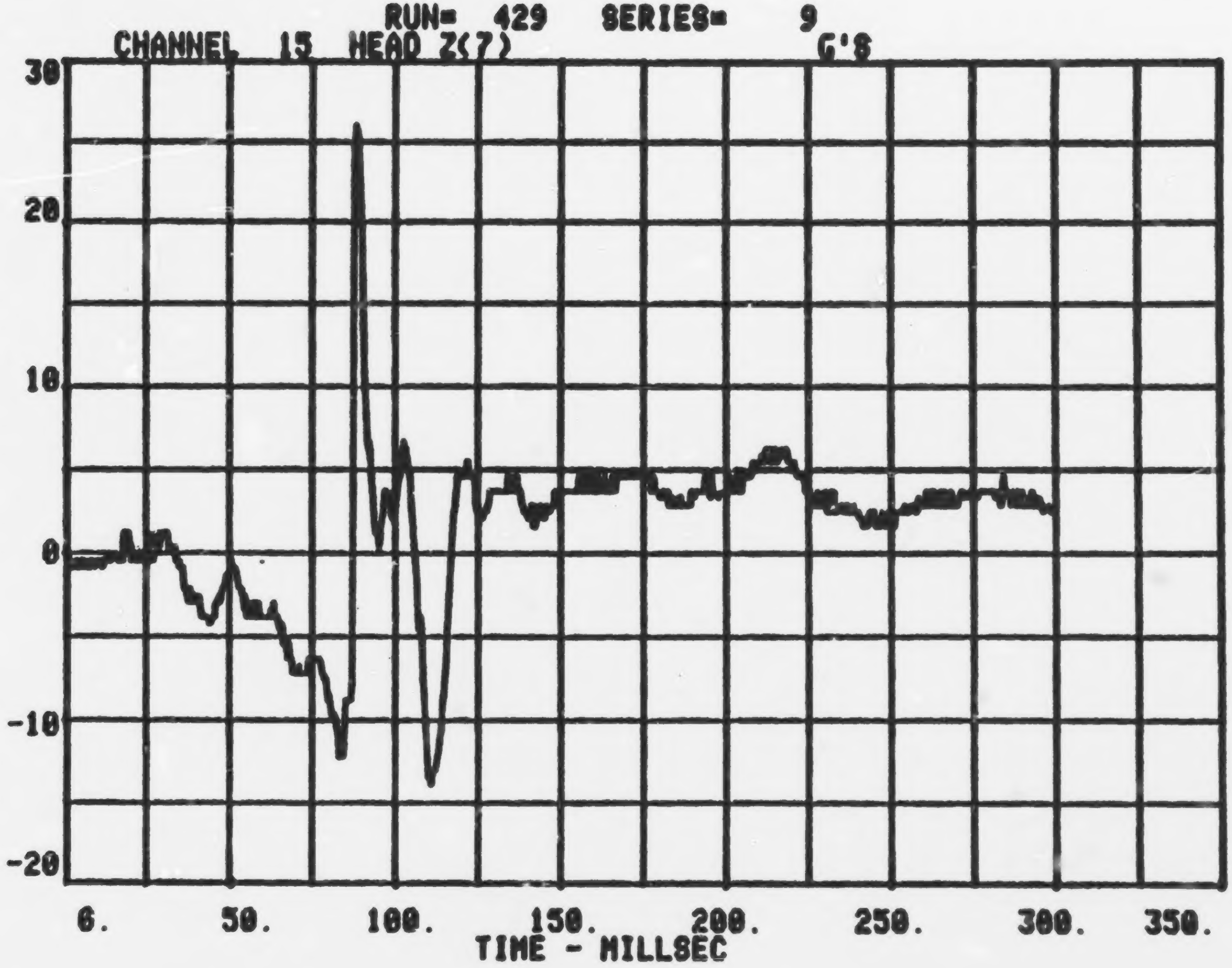

RUN= 429 SERIES= 9
CHANNEL 13 HEAD X(7) G'S
100
75
50
25
0
-25
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

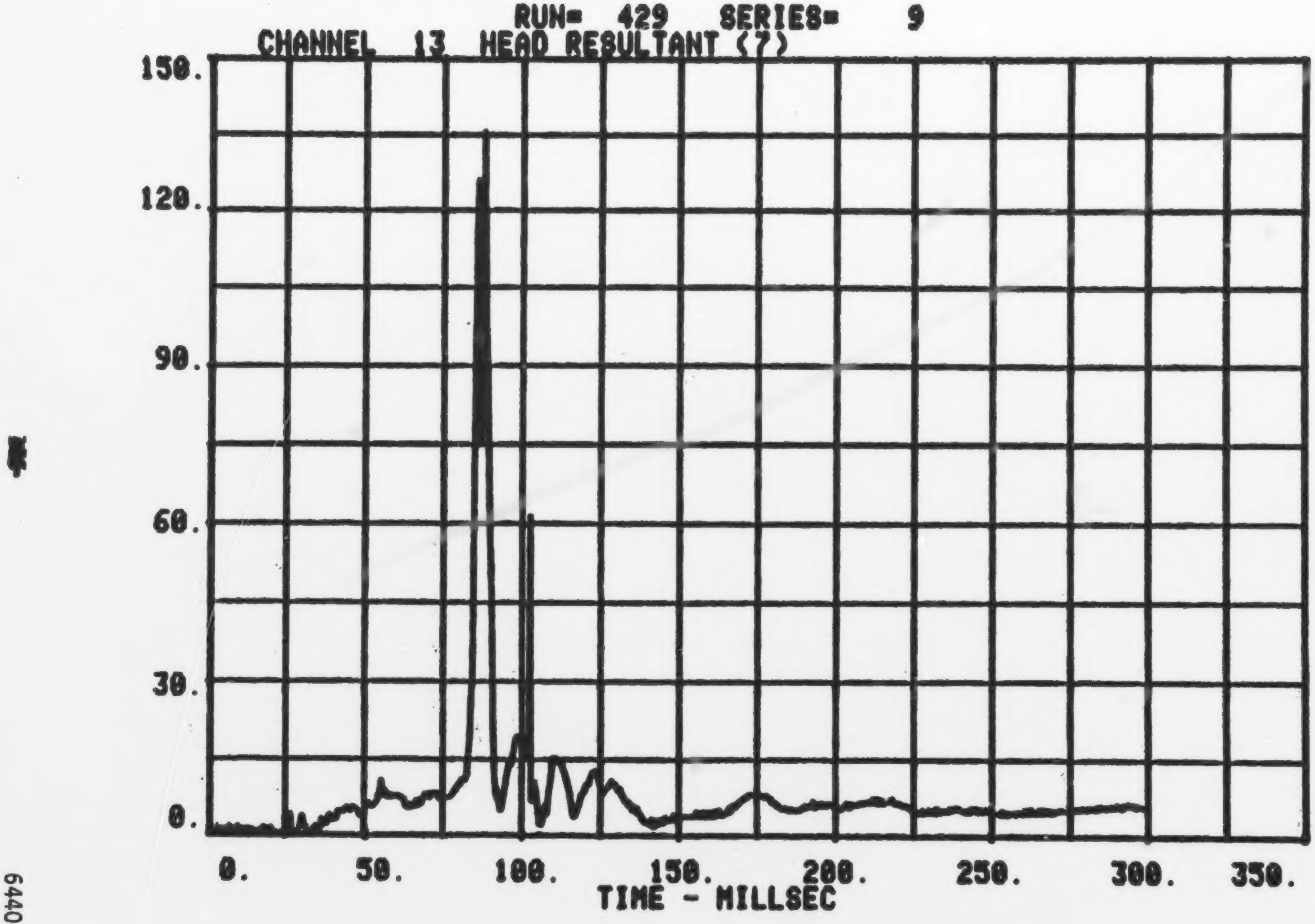

RUN= 429 SERIES= 9
CHANNEL 14 HEAD Y(7)
G'S
40
0
-40
-80
-120
-160
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

704


RUN= 429 SERIES= 9
CHANNEL 15 HEAD Z(7)
G'S
30
20
10
0
-10
-20
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

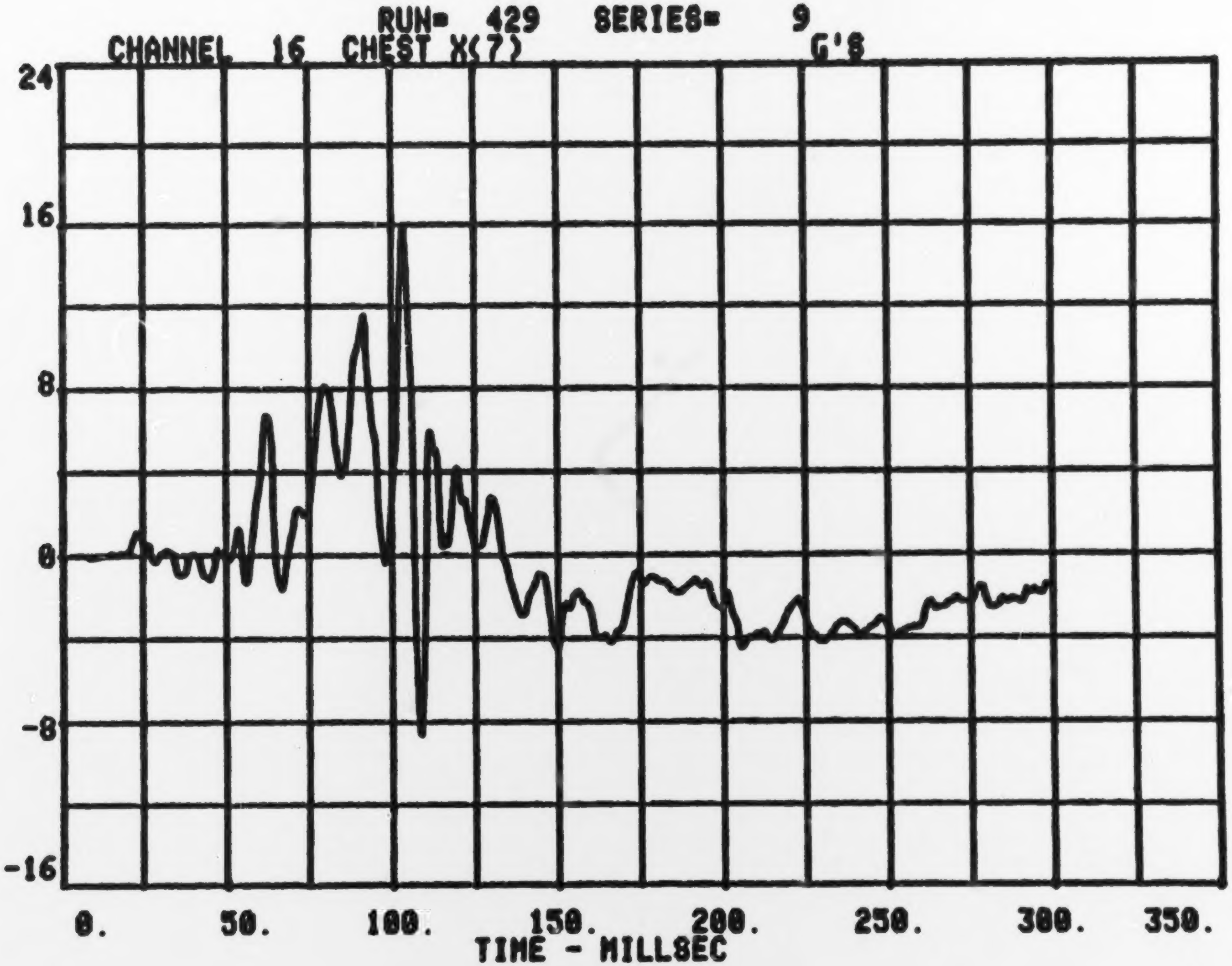
6440-V-5


RUN= 429 SERIES= 9
CHANNEL 13 HEAD RESULTANT (7)
150.
120.
90.
60.
30.
0.
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

706

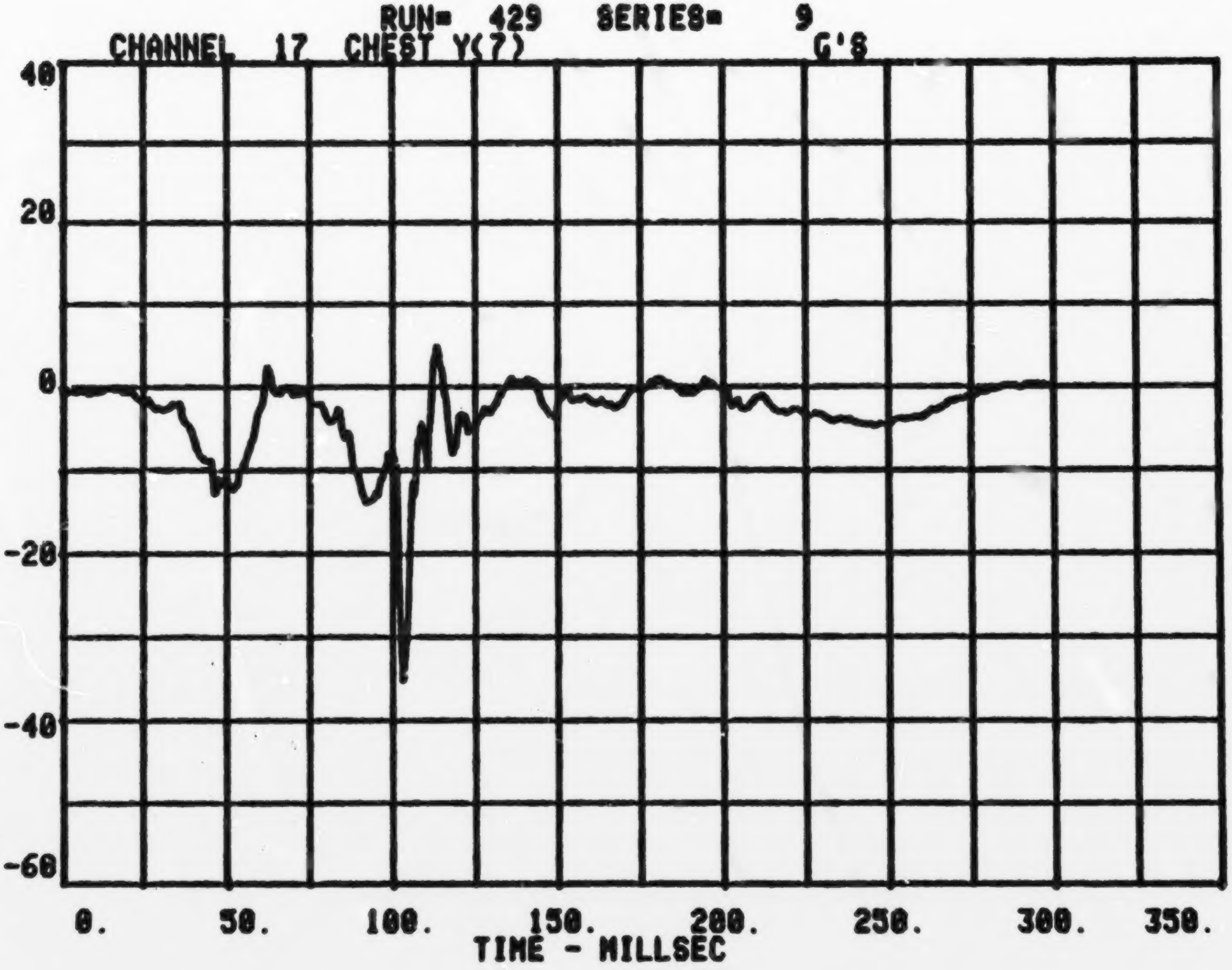
```
            HEAD INJURY CRITERION
             HEAD SEVERITY INDEX

        BUS TEST

        RUN= 429

        HEAD RESULTANT (7)

HIC= 470.0   FROM T1= .08460   TO T2= .08970

AVERAGE ACCELERATION BETWEEN T1 AND T2=  96.8G'S

EVENT TIME= 300.0  MSEC

SEVERITY INDEX= 582.8
```


RUN= 429 SERIES= 9
CHANNEL 16 CHEST X(7) G'S
24
16
8
0
-8
-16
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

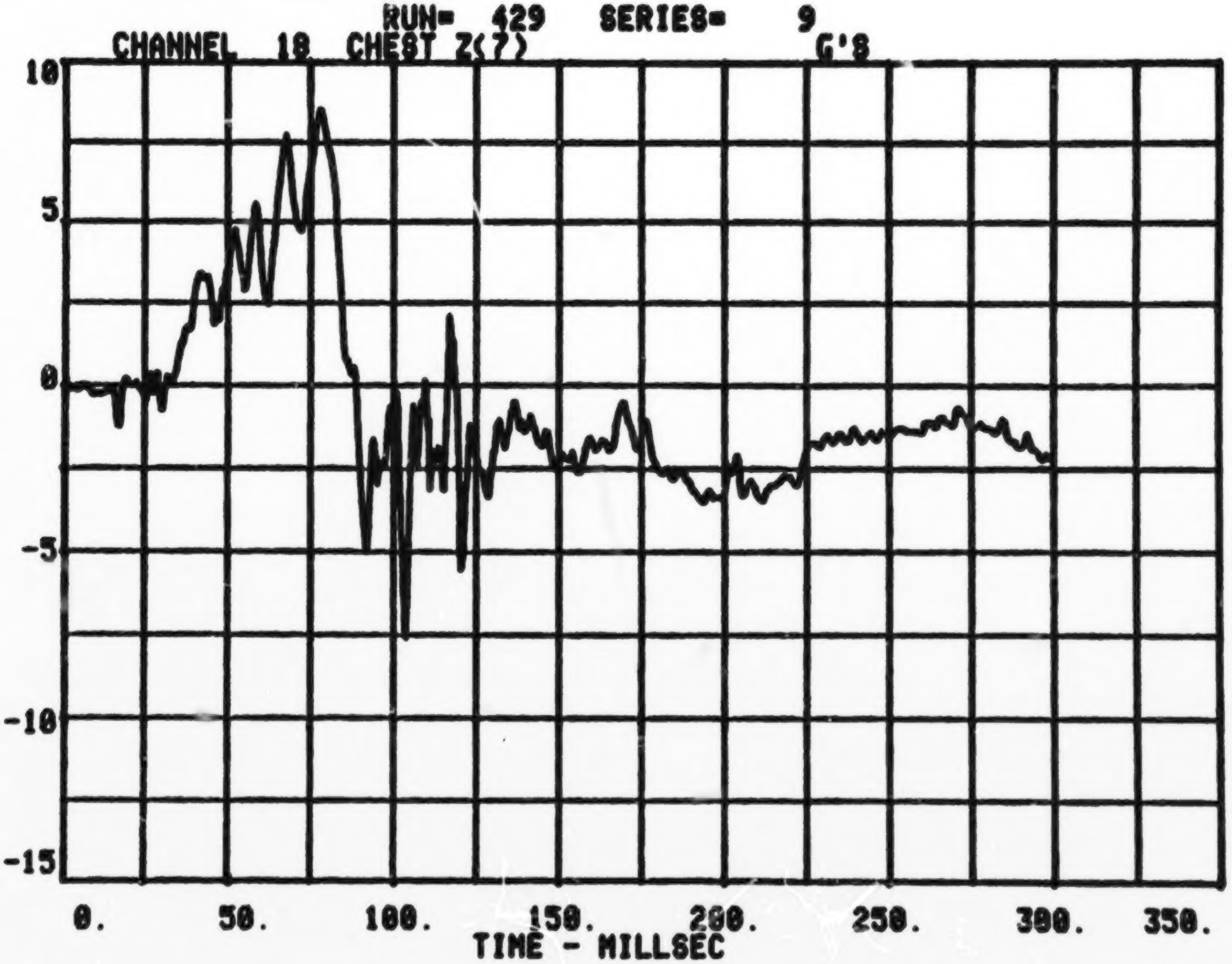
6440-V-5

707

708

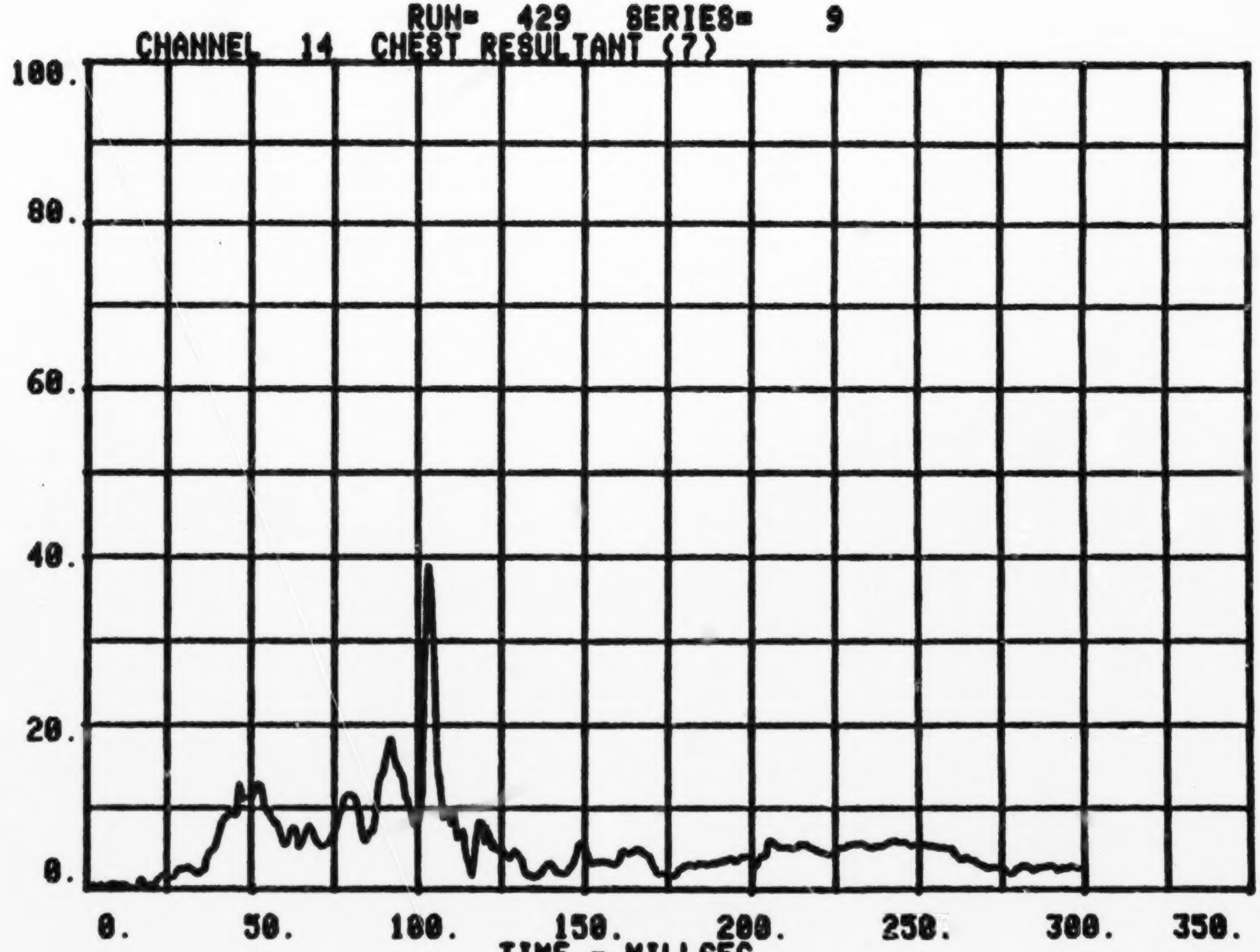

RUN= 429 SERIES= 9
CHANNEL 17 CHEST Y(7)
G'S
40
20
0
-20
-40
-60
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5


RUN= 429 SERIES= 9
CHANNEL 18 CHEST Z(7)
G'S
10
5
0
-5
-10
-15
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

710

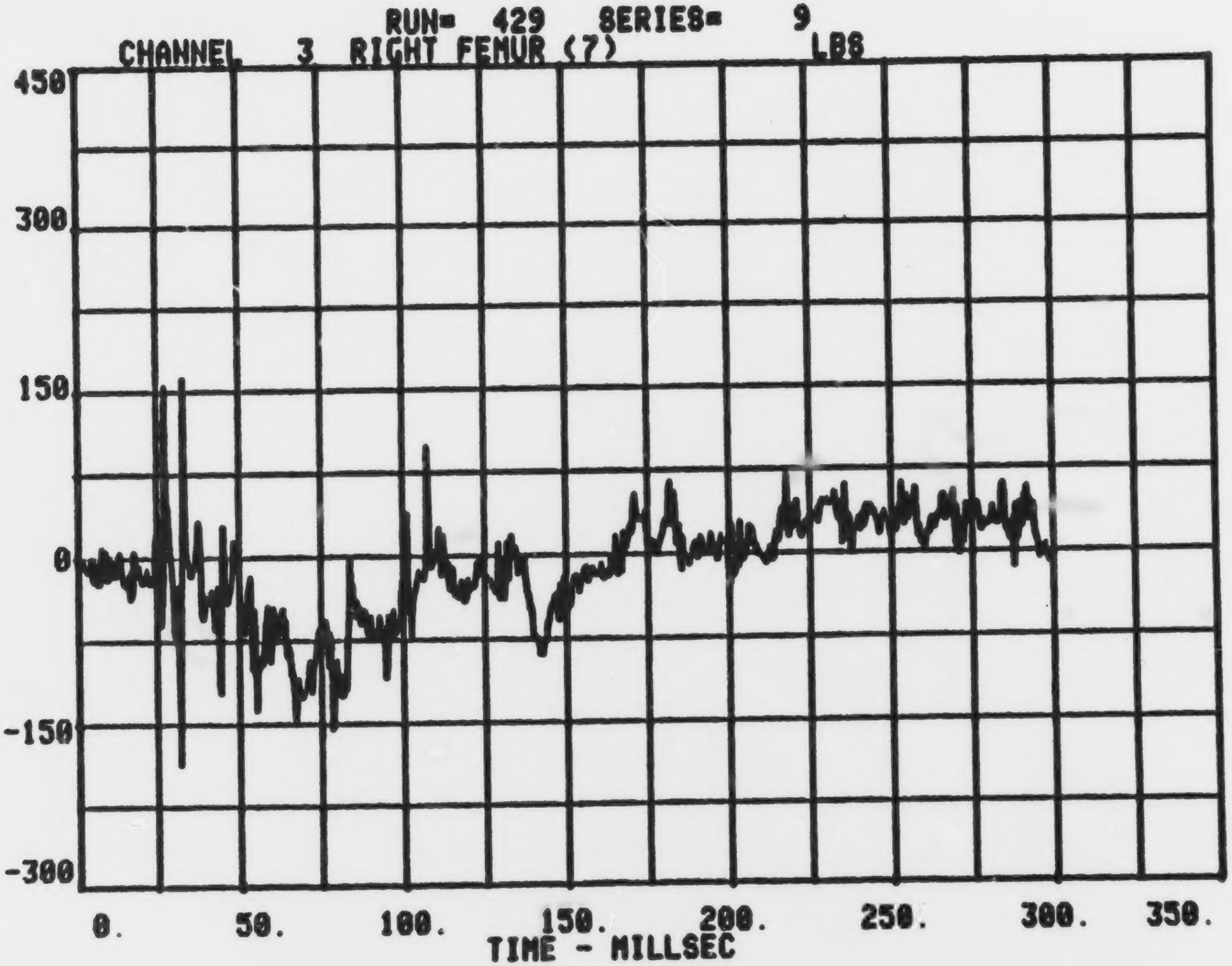

RUN= 429 SERIES= 9
CHANNEL 14 CHEST RESULTANT (7)
100.
80.
60.
40.
20.
0.
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

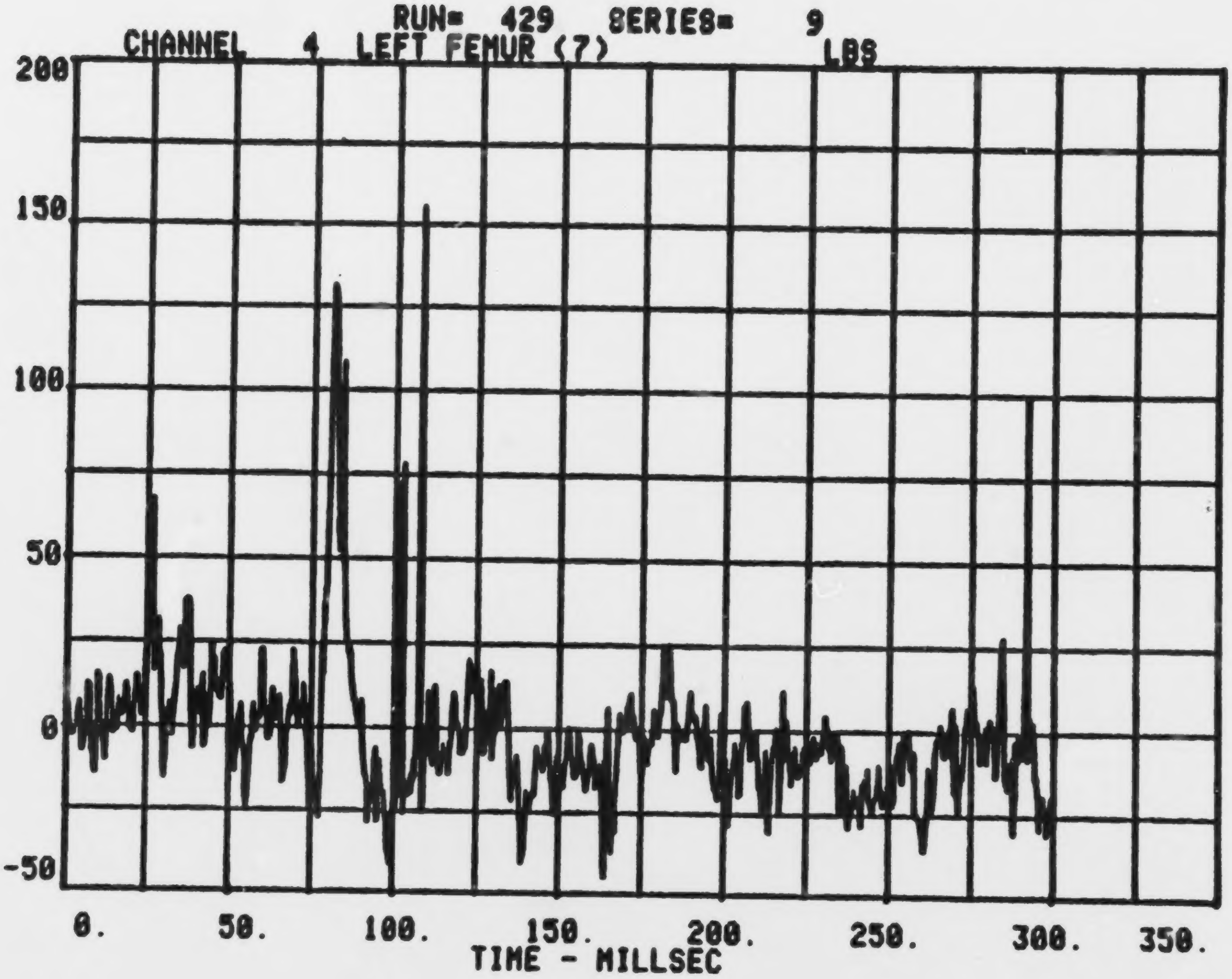
```
                    HEAD INJURY CRITERION
                     HEAD SEVERITY INDEX


               BUS TEST

               RUN= 429

               CHEST RESULTANT (7)

       HIC=  28.1   FROM T1= .03930   TO T2= .11400

       AVERAGE ACCELERATION BETWEEN T1 AND T2=  10.7G'S

       EVENT TIME= 300.0  MSEC

       SEVERITY INDEX=  54.2
```

6440-V-5

712


RUN= 429 SERIES= 9
CHANNEL 3 RIGHT FEMUR (7) LBS
450
300
150
0
-150
-300
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5


RUN= 429 SERIES= 9
CHANNEL 4 LEFT FEMUR (7)
LBS
200
150
100
50
0
-50
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-5

713

BLANK PAGE

CALSPAN ADVANCED
TECHNOLOGY CENTER

BUS CRASH TEST REPORT
TEST NO. 9

Donald A. Alianello
Calspan Report No. 6440-V-6

Prepared for:

Mini cars, Inc.
55 Depot Road
Goleta, California 93017

Purchase Order No. 5458
In support of: NHTSA Contract No. DOT-HS-01774

TEST: Test No. 9

TYPE OF TEST: FRONTAL FIXED BARRIER

TEST DATE: JUNE 21, 1979

A DIVISION OF CALSPAN CORPORATION
AN ARVIN COMPANY P.O. BOX 400 BUFFALO, NEW YORK 14225

715

TABLE OF CONTENTS

Page No.

LIST OF FIGURES iii

LIST OF TABLES iv

PRESENTATION OF RESULTS 1

TEST OBJECTIVES 2

GENERAL COMMENTS 4

TEST NO. 9 - VEHICLE DATA 19

TEST NO. 9 - DUMMY DATA 55

716

LIST OF FIGURES

Figure No.		Page No.
1	OVERALL VEHICLE DIMENSIONS	8
2	PRE-TEST NO. 9, EXTERIOR VIEWS	9
3	POST-TEST NO. 9, EXTERIOR VIEWS	10
4	PRE-TEST NO. 9, INTERIOR VIEWS	11
5	POST-TEST NO. 9, INTERIOR VIEWS	12
6	ACCELEROMETER LOCATIONS AND COMPONENTS - TEST NO. 9	14
7	DUMMY LOCATIONS AND TRANSDUCER SIGNALS RECORDED FOR TEST NO. 9	15
8	PRE- AND POST-TEST NO. 9 - DUMMY LOCATIONS	16
9	ON-BOARD CAMERA COVERAGE FOR TEST NO. 9	17
10	OFF-BOARD CAMERA COVERAGE FOR TEST NO. 9	18

LIST OF TABLES

Table No.		Page No.
1	CRASH TEST SUMMARY	3
2	BUS TEST WEIGHTS - TEST NO. 9	5
3	POST-CRASH DATA SHEET - BUS TEST NO. 9	6
4	DUMMY INJURY CRITERIA VALUES FOR TEST NO. 9	7

718

PRESENTATION OF RESULTS

The test report presents all the test results obtained from Test No. 9 (Frontal Barrier Impact). The test was performed on June 21, 1979 at Calspan's Crash Test Facility in Buffalo, New York. The test vehicle was an International School Bus with a Carpenter body.

Included in this document are still photographs of pre- and post-test conditions of the test vehicle and dummies. Dummy identification and pre- and post-test positions of all dummies are presented. Instrumentation identification and locations of all transducers for all electronic data are presented along with dummy and vehicle data in a plotted format. High speed camera locations and camera speeds are listed in table form.

There were five 50 percentile dummies and two six-year old child dummies instrumented and positioned as shown in Figures 7 and 8.

Two of the Hybrid II, 50 percentile dummies were seated in two wheelchairs. The wheelchair which was designated position 2 was restrained only by the wheelchair handbrake and a folding arm restraint which was mounted from the underside of a fold-up side-facing seat. The other wheelchair, designated position 7, was restrained by the handbrake of the wheelchair plus a wheel clamp on each wheel which was mounted from a fold-up front-facing seat. Both restraint systems failed on impact with the barrier.

TEST OBJECTIVES

The principal objective in performing the full-scale crash tests on the International School Bus was to obtain a deceleration crash pulse for the vehicle and to provide a crash environment to test the following parameters:

- Performance of the wheelchair tie-down attachments as shown in Figure 6.
- Injury criteria data for the on-board dummy occupants.
- Trajectory information for the on-board dummy occupants.

The test was also performed to obtain data lost due to a malfunction of instrumentation on the previous school bus test No. 2.

Table 1

CRASH TEST SUMMARY

TEST NO. 9

PROJECT: MINICARS BUS TEST

DATE: 6/21/79

TIME: 14:50

TEMP: 80°F

TEST CONDITION: FRONTAL PERPENDICULAR FIXED BARRIER

VEHICLE: INTERNATIONAL SCHOOL BUS WITH CARPENTER BODY

TEST WEIGHT (lbs) 15270

IMPACT ANGLE (deg)* 0

IMPACT VELOCITY (mph)** 21.12

MAX. CRUSH (in) 21

MAX. INTRUSION (in) --

DUMMIES

TYPE 5 - 50 PERCENTILE
2 - 6-YEAR OLD CHILD

LOCATION SEE FIGURE 7

RESTRAINT SEE FIGURE 7

NUMBER OF DATA CHANNELS 72

NUMBER OF HIGH SPEED CAMERAS 12 + 1 REAL TIME

---

*With respect to tow track Centerline

**Speed trap measurement (± .05% accuracy)

GENERAL COMMENTS

- Front section of floor around driver and front entrance buckled.

- Floor over rear axle buckled.

- Body of bus moved 15 inches forward on frame.

- Wheelchair attachments failed on chair with two attachments. The jaws on one clamp failed, allowing chair to move forward and pull out of other clamp. This allowed the dummy and chair to move forward and go part way through the windshield.

- The wheelchair which was held in place with arm attached to side seat also moved forward bending the restraining arm and arm attachment.

- Dummy No. 6 broke off arm rest on side-facing seat.

- 6-year old child sitting in side-facing seat bent arm rest and came to rest on floor in front of seat.

- The driver's head hit windshield.

- Accelerometer package No. 3 had a cut wire on the X accelerometer at about 60 milliseconds due to body of bus moving forward.

Table 2

BUS TEST WEIGHTS - TEST NO. 9

LEFT FRONT	2970 lbs	LEFT REAR	4750 lbs
RIGHT FRONT	2930 lbs	RIGHT REAR	4620 lbs
TOTAL FRONT	5900 lbs	TOTAL REAR	9370 lbs

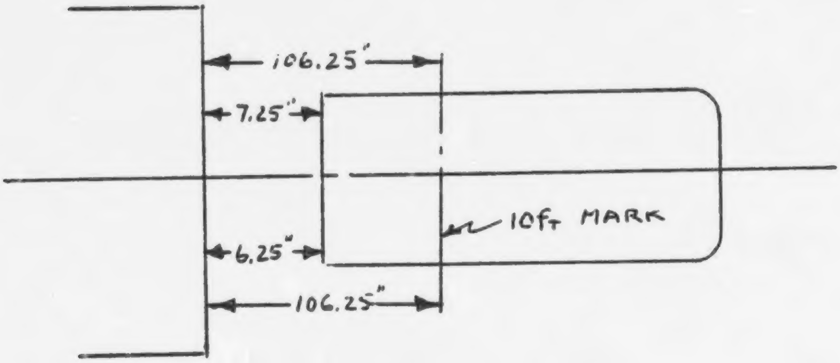
TOTAL WEIGHT = 5900 lbs + 9370 lbs = 15270 lbs.

WHEEL BASE = 255.5 inches

$$Cg_{FW} = \frac{9370 \text{ lbs} \times 255.5 \text{ inches}}{15270 \text{ lbs}} = 156.8 \text{ inches}$$

Table 3

POST-CRASH DATA SHEET - BUS TEST NO. 9


106.25"
7.25"
10ft MARK
6.25"
106.25"

AVERAGE REBOUND = 6.75 inches

RIGHT SIDE CRUSH = 21 inches

LEFT SIDE CRUSH = 20 inches

BODY OF VEHICLE SLID FORWARD ON FRAME AS FOLLOWS:

DRIVER'S SIDE = 14.25 inches
CURB SIDE = 15.50 inches

Table 4

DUMMY INJURY CRITERIA VALUES FOR TEST NO. 9

DUMMY No.	MAXIMUM ACCELERATION ("G)*								HEAD	T1 SEC	T2 SEC
	HEAD				CHEST						
	X	Y	Z	R	X	Y	Z	R	HIC**		
1	-34	-2.1	35	45	-11.7	3.6	16	19	238	.119	.162
2	-11.2	8.8	16.5	19	-10.8	-7.2	7	13	70	.152	.246
3	-55	5	25	58	-25	16	8.1	26	246	.132	.173
4	-50	9	45	62	-37	23	10	43	325	.121	.142
5	10.8	13.2	29.5	30	9.8	17.2	10	22.5	101	.106	.183
6	- 3	-4.5	20.8	21	-2.2	-3.9	8	8	87	.141	.244
7	-45	8.3	20	50	-19	4	10	21	95	.262	.267

DUMMY NO.	MAXIMUM FORCE - SEAT BELT LOADS LBS	
	RIGHT BELT LOAD	LEFT BELT LOAD
1	620	720
2	890	725
7	1000	775

DUMMY NO.	MAXIMUM FORCE - FEMUR LOADS LBS	
	RIGHT	LEFT
4	585	450
6	300	-

*DEFINED AS EXCEEDING .003 SEC. DURATION.

**AS DEFINED IN FMVSS NO. 208.

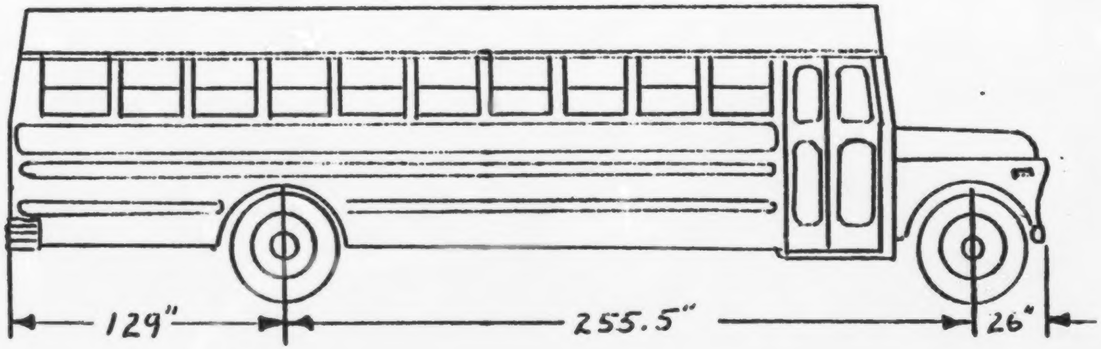


FIGURE 1   OVERALL VEHICLE DIMENSIONS

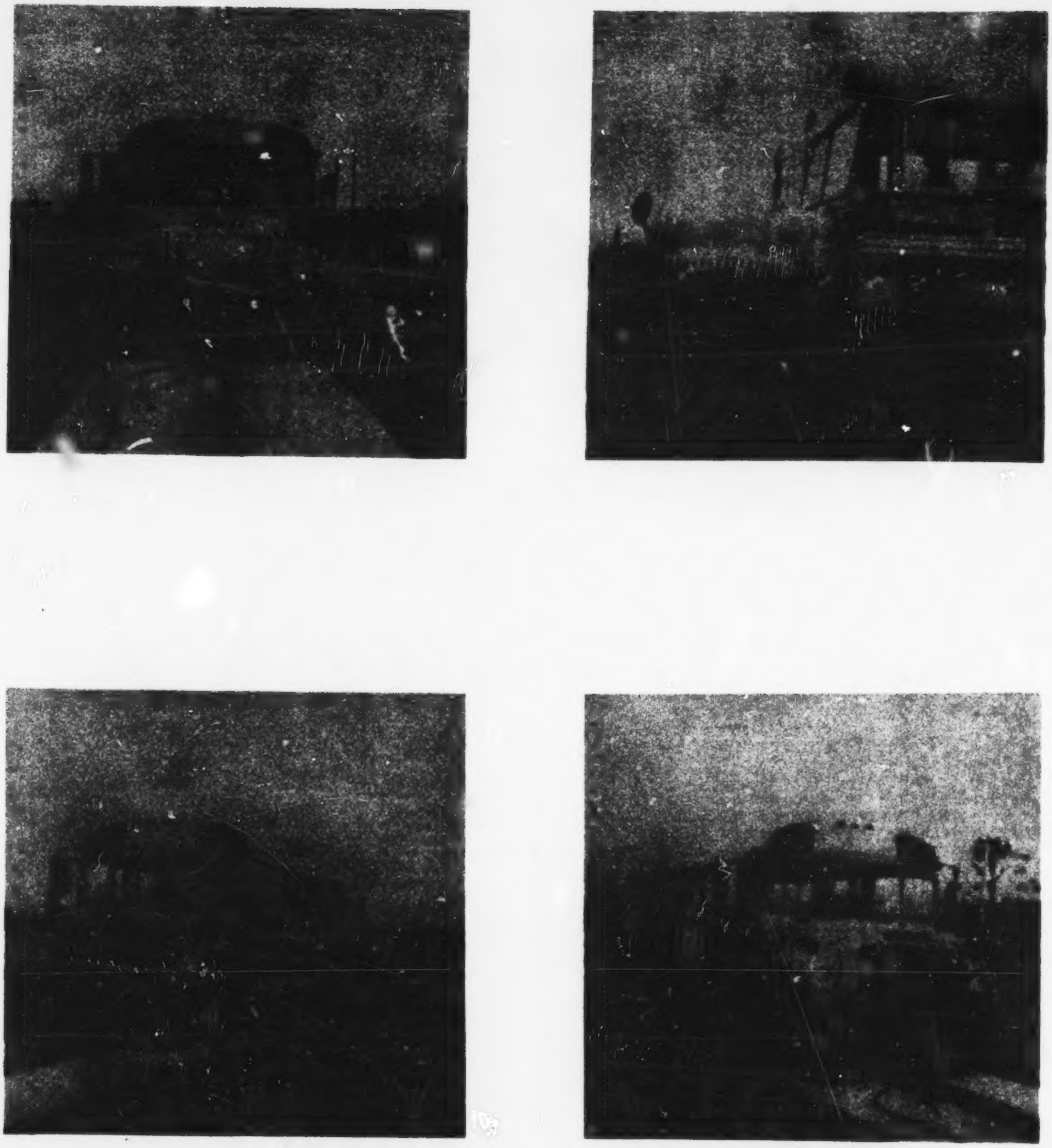


FIGURE 2   PRE-TEST NO. 9, EXTERIOR VIEWS

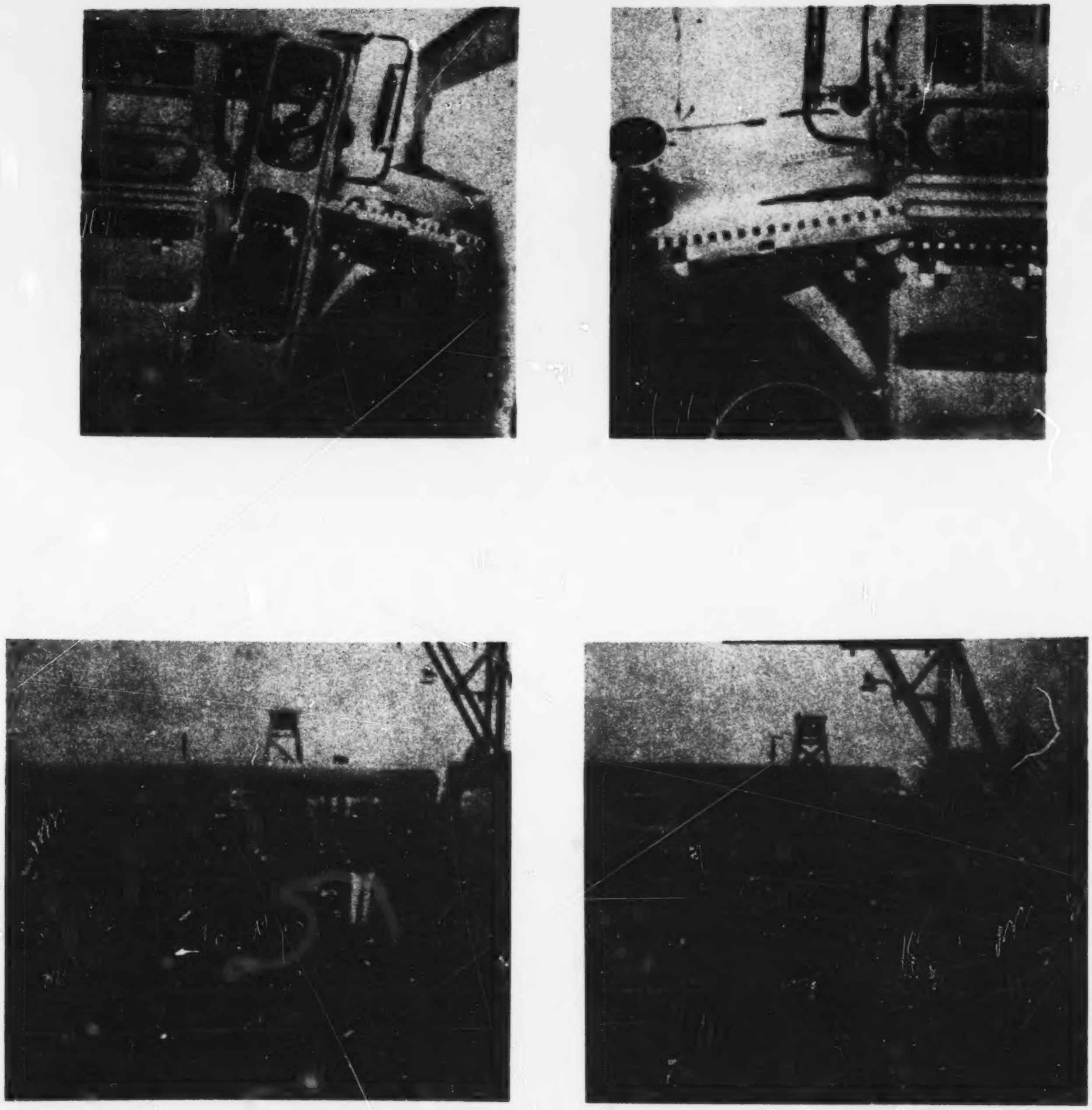


FIGURE 3 POST-TEST NO. 9, EXTERIOR VIEWS

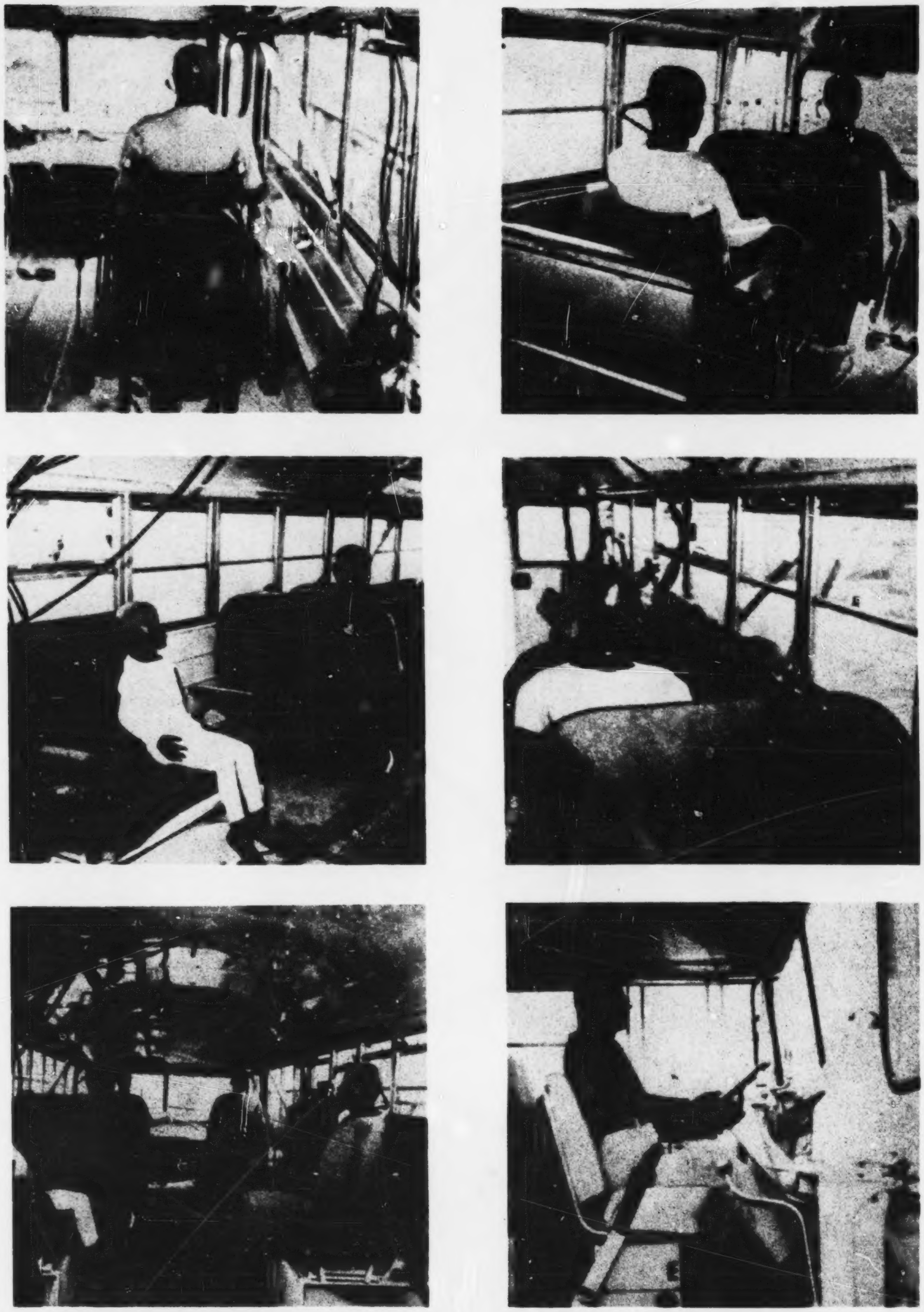


FIGURE 4 PRE-TEST NO. 9, INTERIOR VIEWS

6440-V-6

729

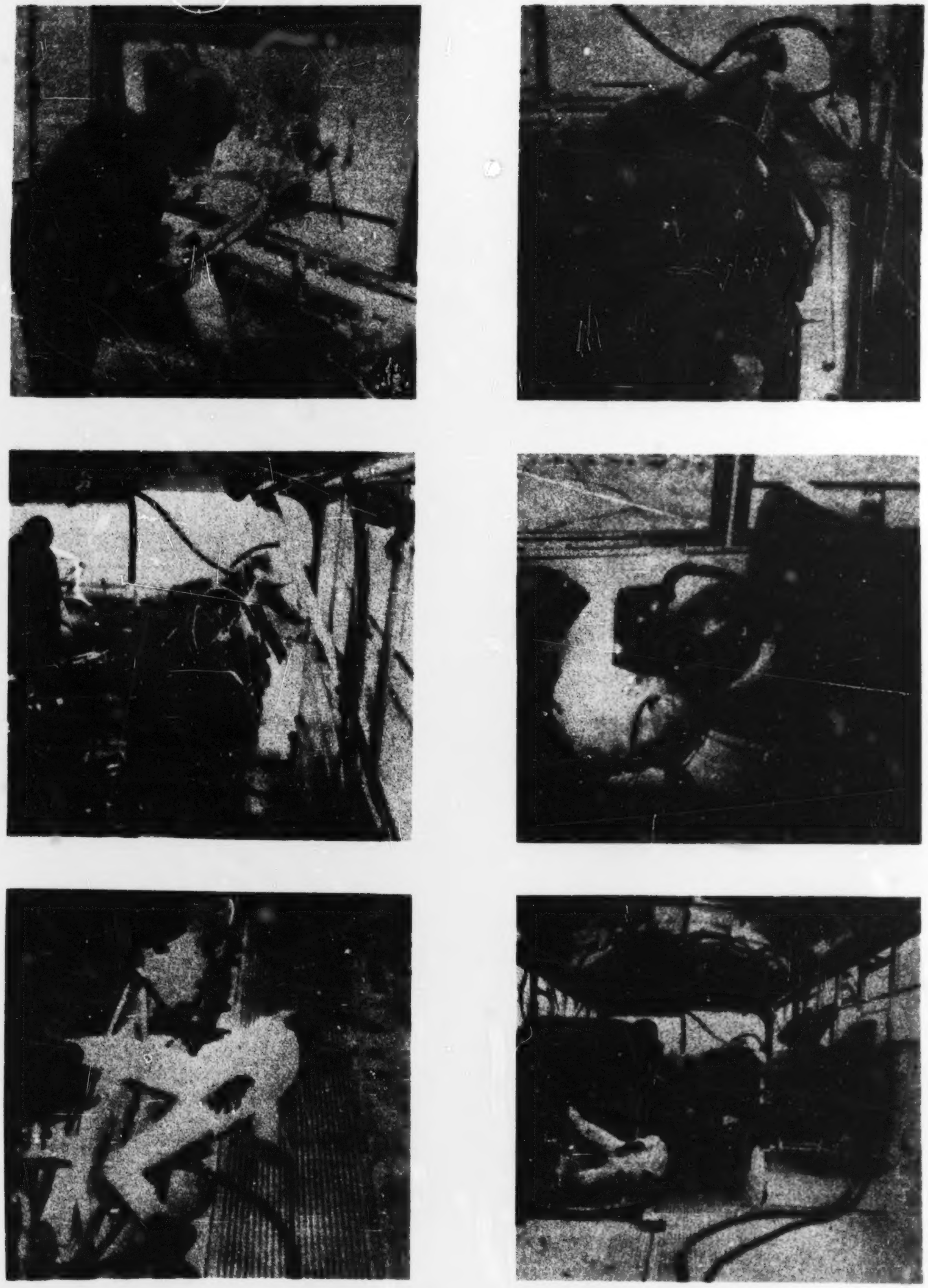


FIGURE 5 POST-TEST NO. 9, INTERIOR VIEWS

6440-V-6

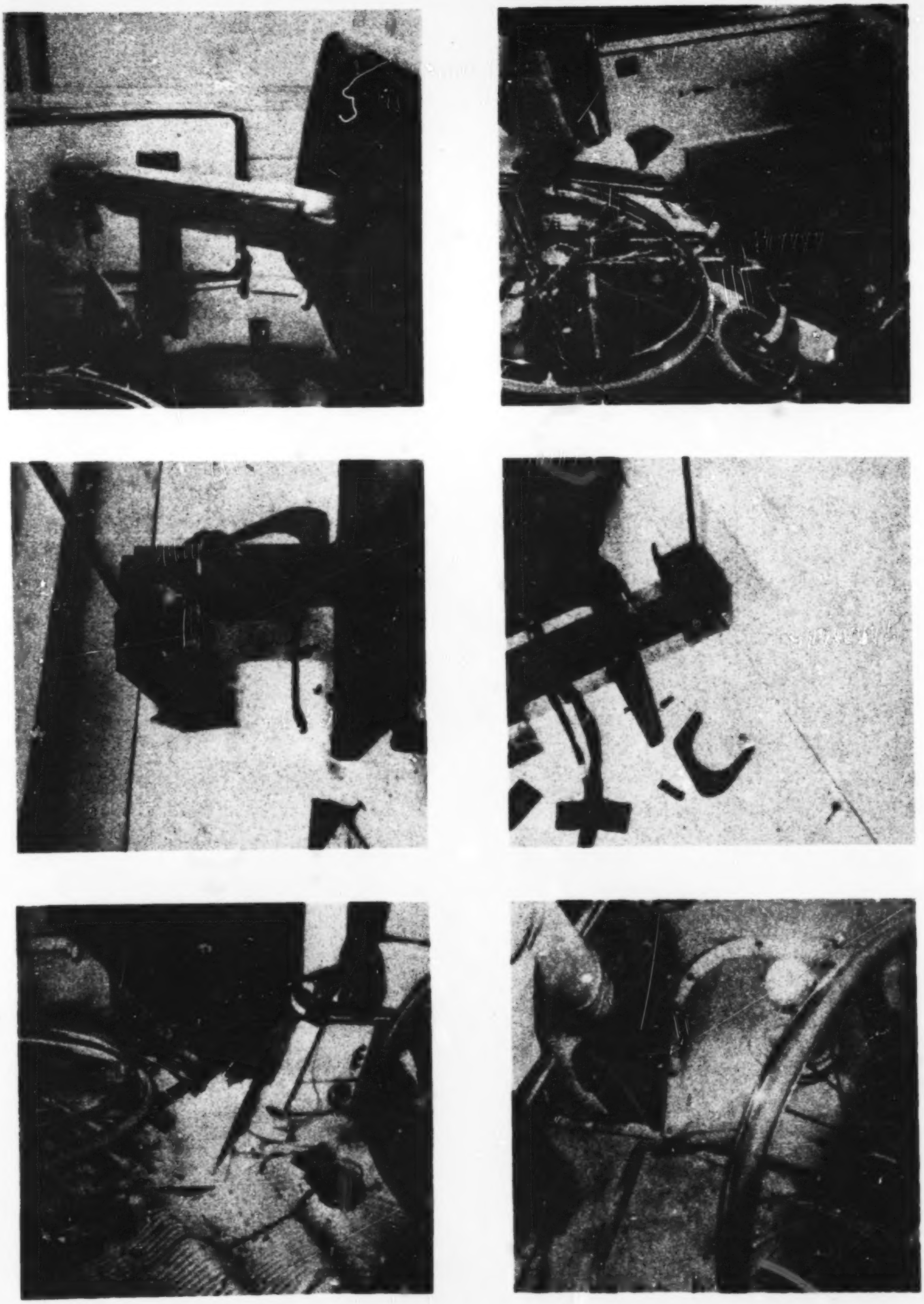
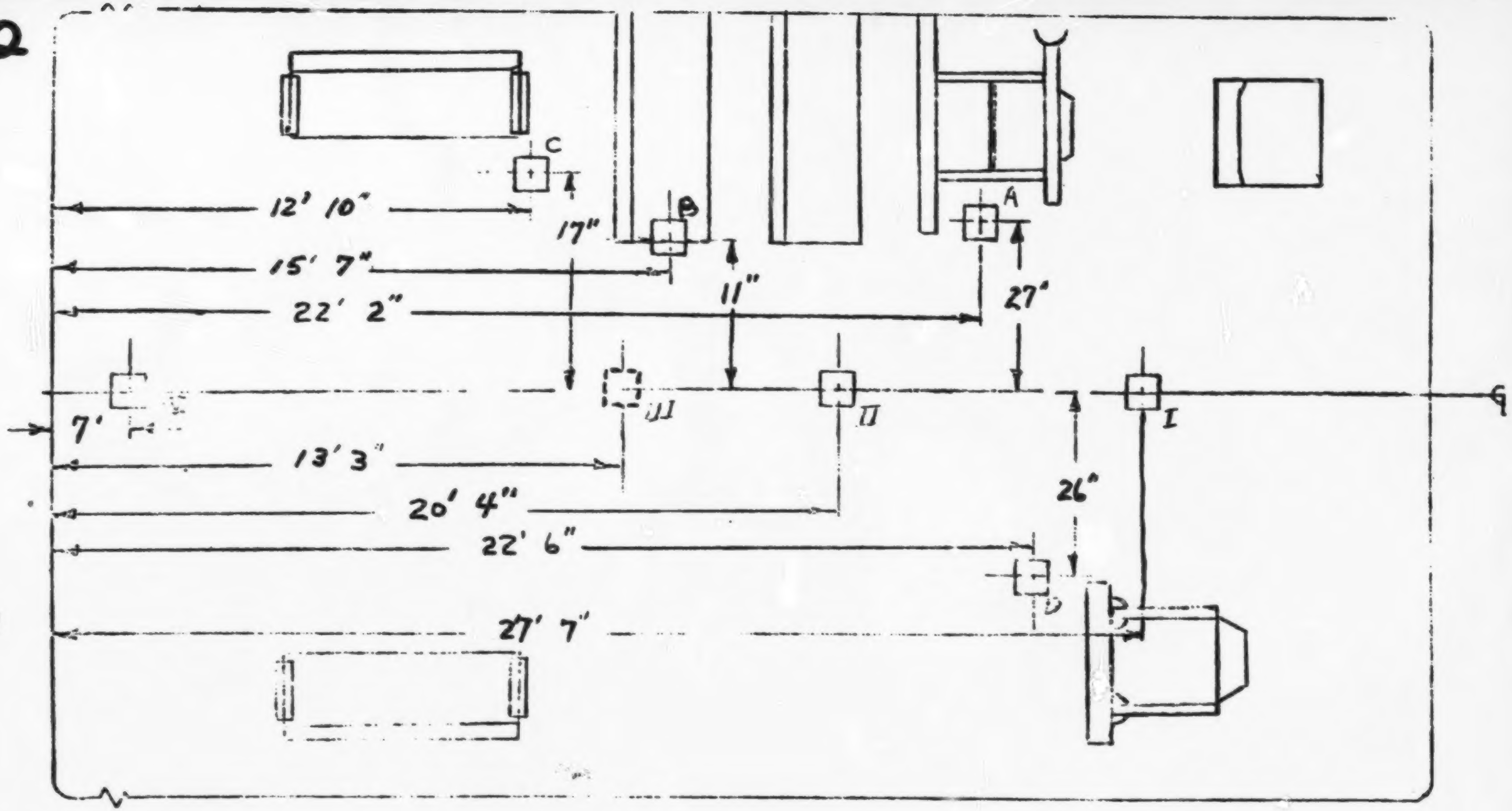


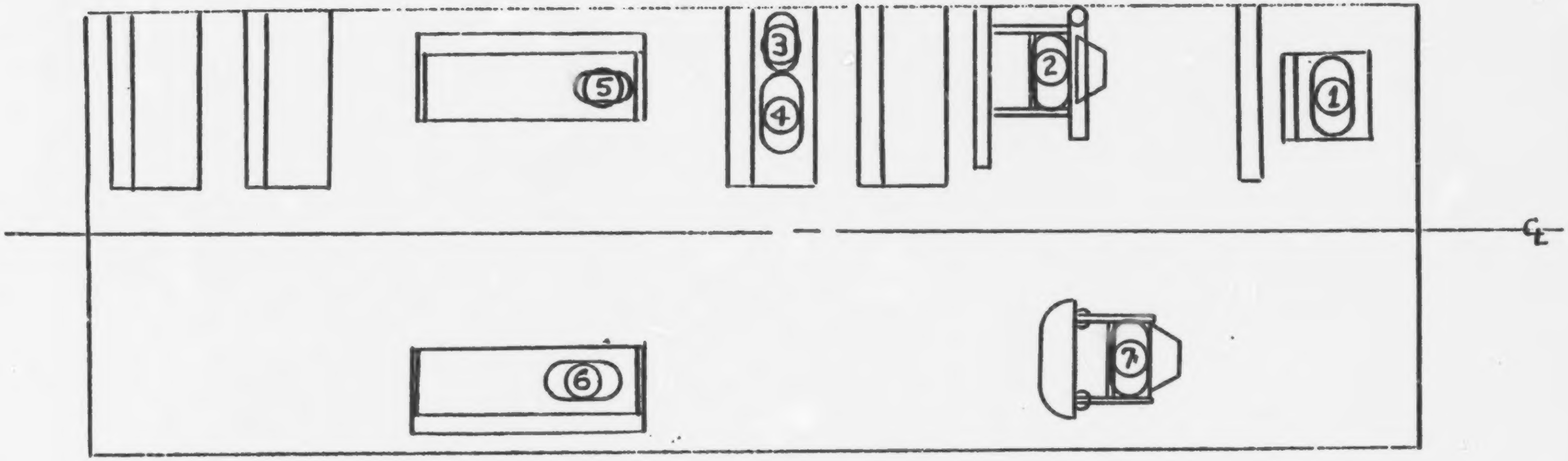
FIGURE 5 (cont'd) POST-TEST NO. 9, INTERIOR VIEWS


C
12' 10"
17"
B
15' 7"
A
22' 2"
11"
27"
7'
IV
III
II
I
℄
13' 3"
20' 4"
26"
22' 6"
D
27' 7"

ACCEL NO.	ACCEL. COMP.
I	X Y Z
II	X Y Z
III	X Y Z
IV	X Y Z
A	X Y
B	X Y
C	X Y
D	X Y

FIGURE 6 ACCELEROMETER LOCATIONS AND COMPONENTS - TEST NO. 9

6440-V-6

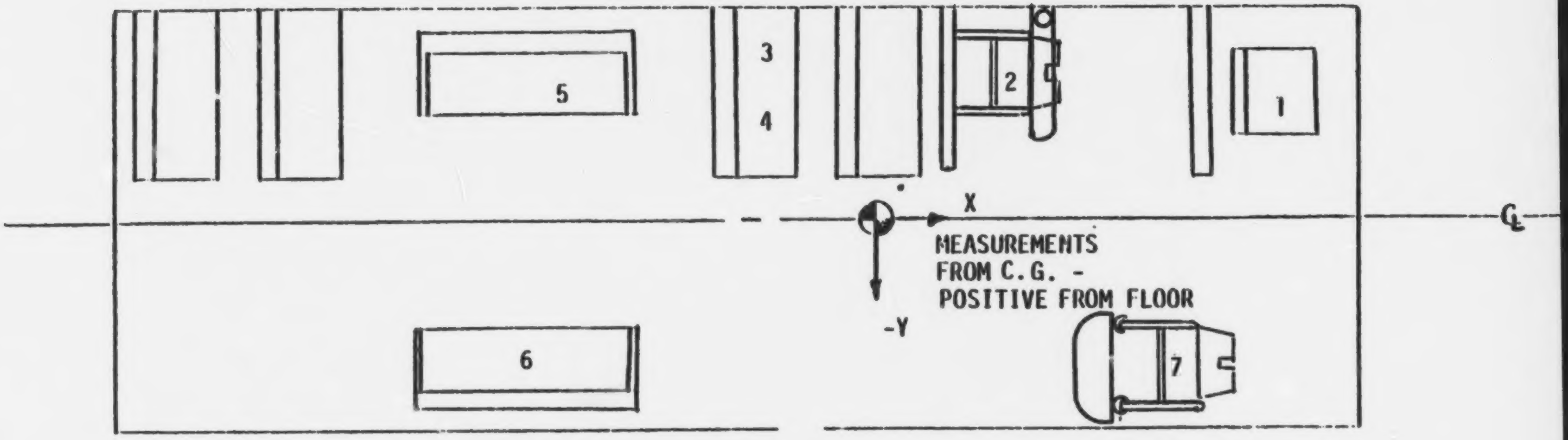


DUMMY POS. & TYPE	TRANSDUCERS			
	HEAD (ACCEL.)	CHEST (ACCEL.)	FEMUR (LOADS)	BELTS (LOADS)
(1) 50%	X, Y, Z	X, Y, Z	--	RIGHT, LEFT
(2) 50%	X, Y, Z	X, Y, Z	--	RIGHT, LEFT
(3) 6-YR OLD	X, Y, Z	X, Y, Z	--	--
(4) 50%	X, Y, Z	X, Y, Z	RIGHT, LEFT	--
(5) 6-YR OLD	X, Y, Z	X, Y, Z	--	--
(6) 50%	X, Y, Z	X, Y, Z	RIGHT, LEFT	--
(7) 50%	X, Y, Z	X, Y, Z	--	RIGHT, LEFT

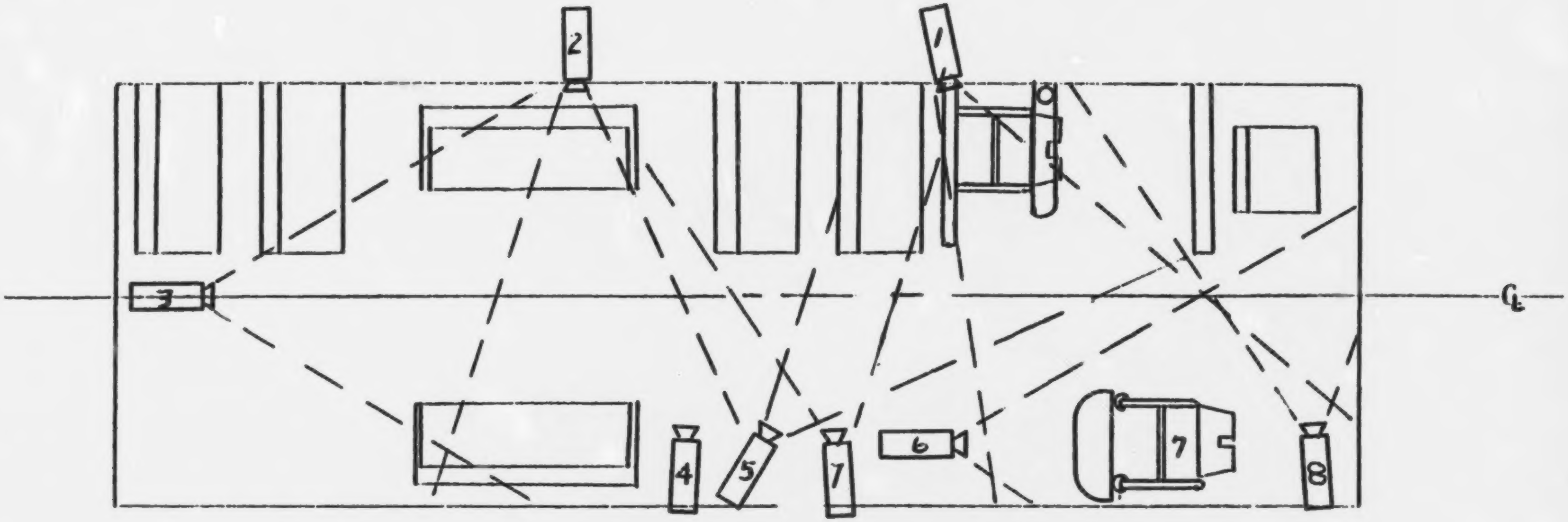
FIGURE 7 DUMMY LOCATIONS AND TRANDUCER SIGNALS RECORDED FOR TEST NO. 9

6440-V-6

FIGURE 8 PRE- AND POST-TEST NO. 9 - DUMMY LOCATIONS

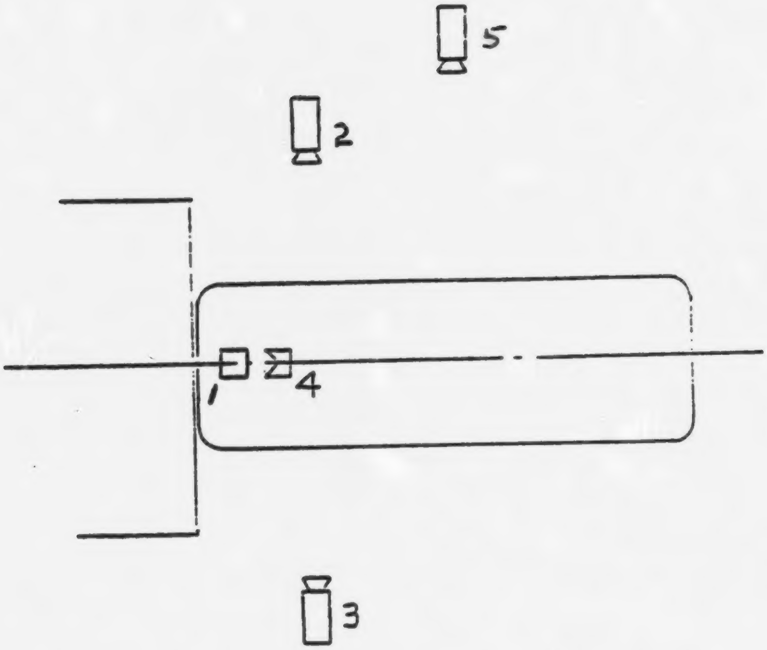


DUMMY LOCATION		HEAD TARGET			HIP TARGET			KNEE TARGET		
		X	Y	Z	X	Y	Z	X	Y	Z
1	PRE	93-1/2	15-1/4	47-1/4	85-1/2	10	24	115-3/4	11	18-3/4
	POST	117-1/2	17-1/2	45	89-1/2	14	24-1/2	114	11-1/2	21-1/2
2	PRE	36-1/2	20-1/4	47-1/2	43	15-1/2	21-1/2	57-1/2	16	23-1/2
	POST	29-1/2	12-1/2	18-1/2	49	- 3	20	54	13	11-1/2
3	PRE	-51-1/4	31-1/4	35-1/2	-47-1/2	32	18	-35	33	19-1/2
	POST	-50	50-1/2	23-1/2	-36	35-1/2	15-1/2	-27-1/2	29-1/2	12
4	PRE	-48-1/4	16-1/2	44-1/2	-45-1/2	12	19	-29-1/2	11	19-1/2
	POST	-49-1/2	7-1/2	35-1/4	-46	24-1/2	19-1/2	-35-1/4	18-1/2	15
5	PRE	-88-1/2	38-1/2	36-3/4	-87-1/2	30-1/4	19-1/4	-88	21-1/2	19
	POST	-84-1/2	- 1/2	7-1/2	-92	8-3/4	9-1/2	-108-3/4	20	15
6	PRE	-90	-36	44-1/2	-83-1/4	-31-1/4	19	-86	-17-1/8	19-1/2
	POST	-20-1/2	-18	3-1/2	6	-13-1/2	3	21-1/2	-14	8-1/2
7	PRE	53-1/2	-23-1/4	48-1/2	57	-20-1/2	23-1/4	73-1/2	-21-1/2	23-1/2
	POST	131-1/2	-26-1/2	40-1/2	106-1/2	-19-1/2	19	114-1/4	-23-3/4	8-1/2



LOC. NO.	LOCATION	TYPE	LENS (MM)	SPEED (fps)	FIELD OF VIEW
1	AS SHOWN	STALEX	8	580	AS SHOWN
2	AS SHOWN	STALEX	8	720	AS SHOWN
3	AS SHOWN	STALEX	8	590	AS SHOWN
4	AS SHOWN	PHOTOSONICS	8	910	AS SHOWN
5	AS SHOWN	PHOTOSONICS	8	1190	AS SHOWN
6	AS SHOWN	PHOTOSONICS	8	≈150	AS SHOWN
7	AS SHOWN	PHOTOSONICS	8	≈150	AS SHOWN
8	AS SHOWN	PHOTOSONICS	8	520	AS SHOWN

FIGURE 9 ON-BOARD CAMERA COVERAGE FOR TEST NO. 9



LOC. NO.	LOCATION	CAMERA TYPE	LENS (MM)	SPEED (fps)
1	OVERHEAD	PHOTOSONIC	13	640
2	SOUTH CLOSE	PHOTOSONIC	25	*
3	NORTH CLOSE	PHOTOCONIC	25	**
4	PIT	PHOTOSONIC	13	590
5	REAL TIME			

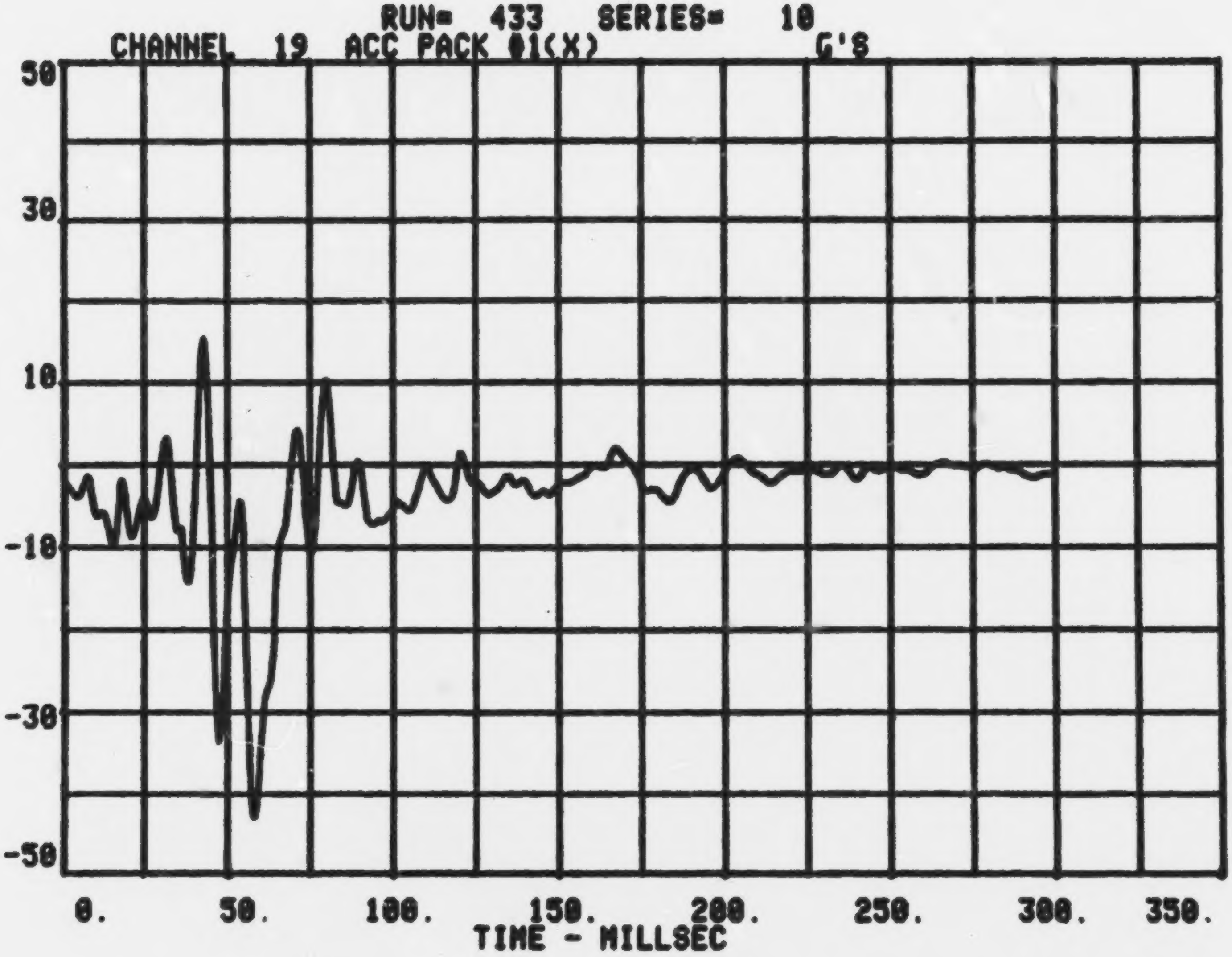
* TIMING LIGHT DATA LOST
** CAMERA DID NOT RUN

FIGURE 10 OFF-BOARD CAMERA COVERAGE FOR TEST NO. 9

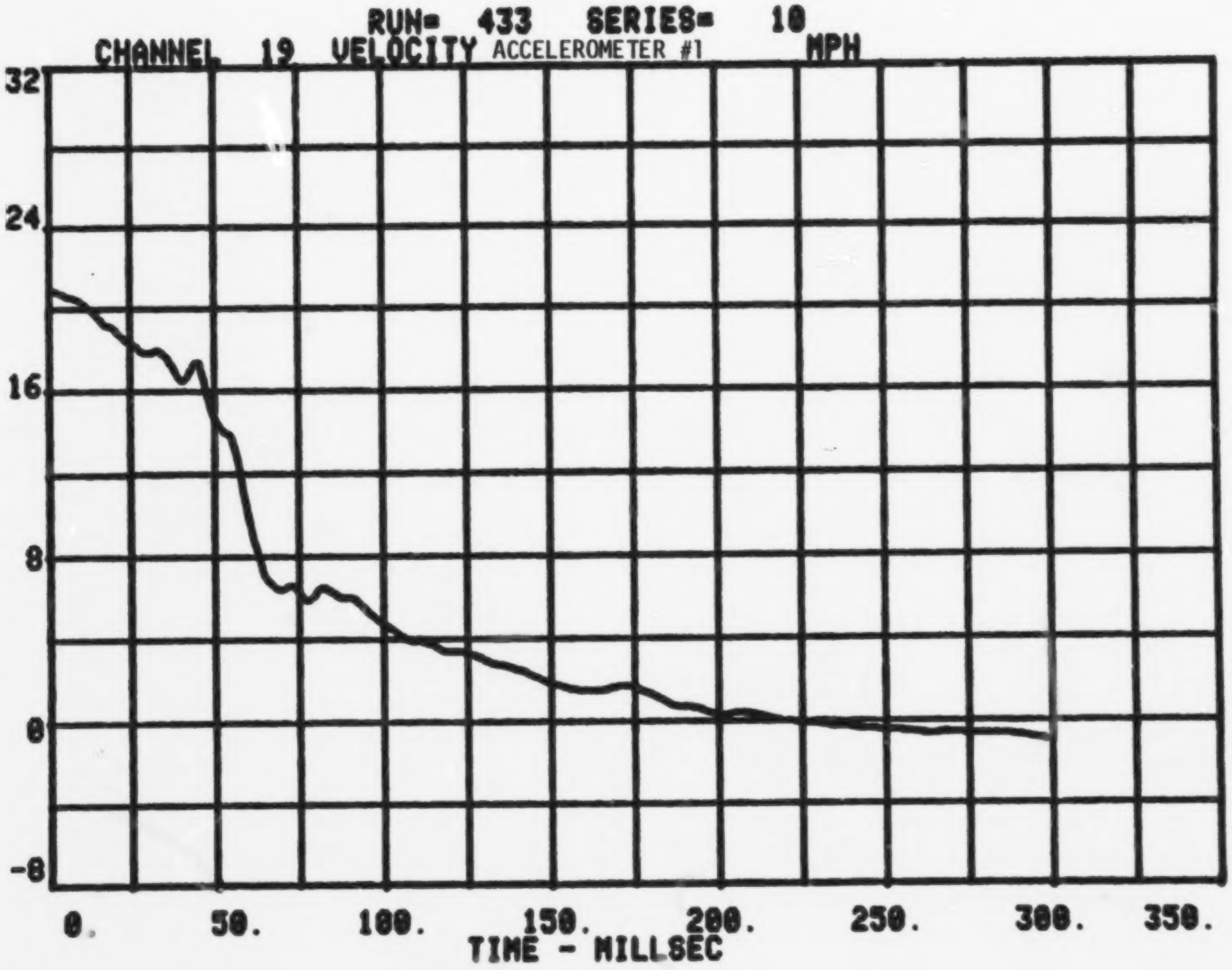
TEST NO. 9

VEHICLE DATA

FILTER CHANNEL CLASS NO. 60

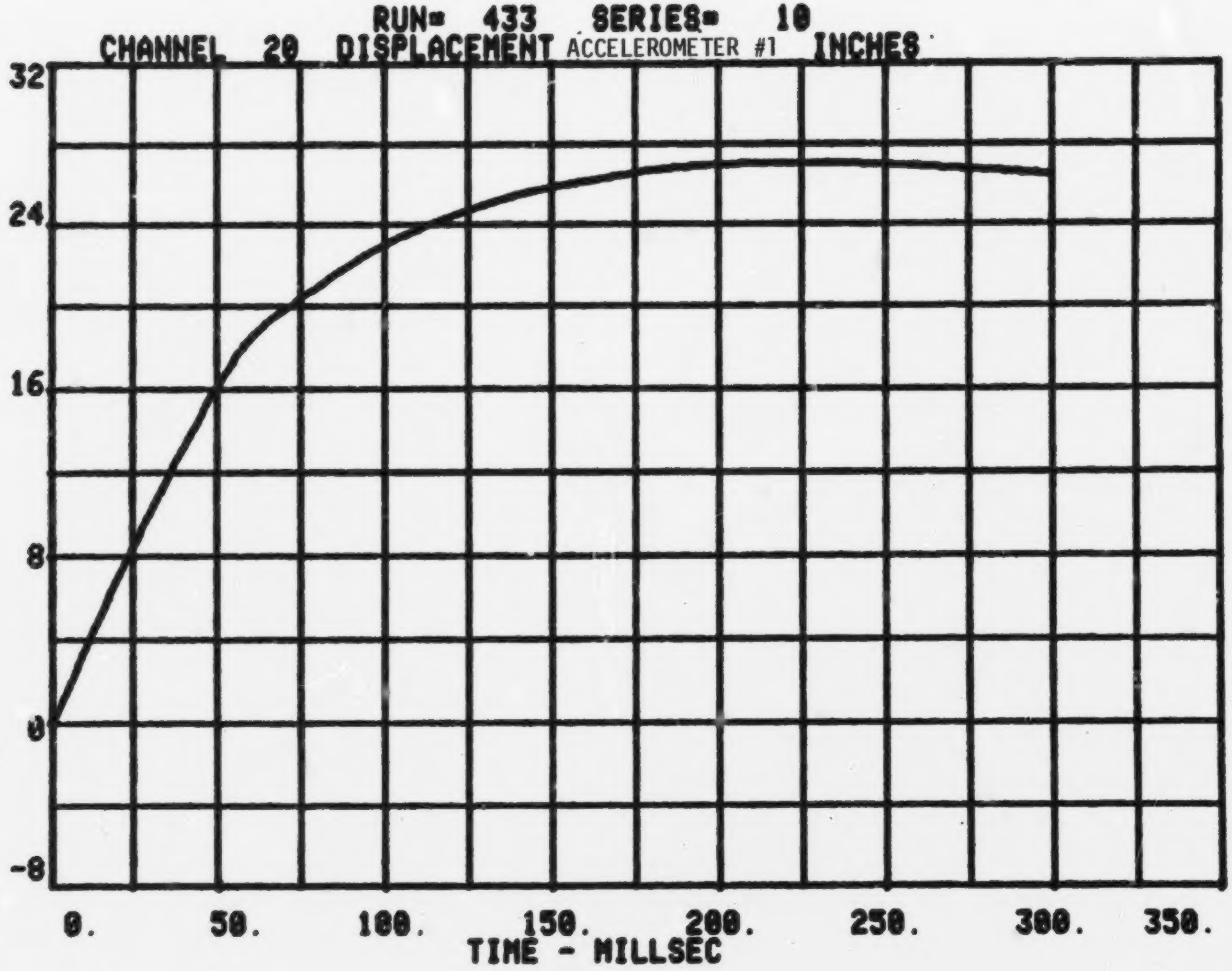

RUN= 433 SERIES= 10
CHANNEL 19 ACC PACK #1(X)
G'S
50
30
10
-10
-30
-50
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

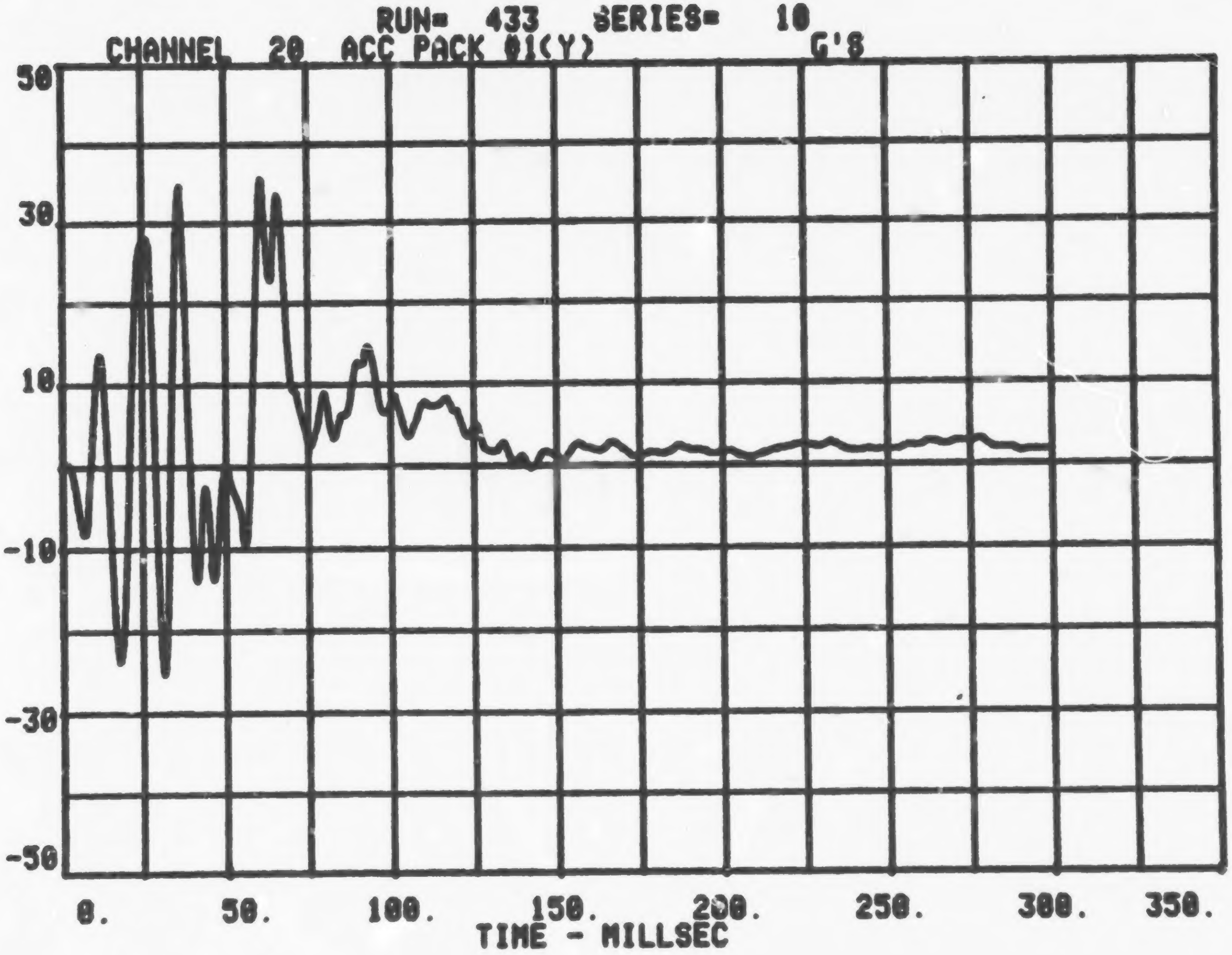

RUN= 433 SERIES= 10
CHANNEL 19 VELOCITY ACCELEROMETER #1 MPH
32
24
16
8
0
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

740


RUN= 433 SERIES= 10
CHANNEL 20 DISPLACEMENT ACCELEROMETER #1 INCHES
32
24
16
8
0
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

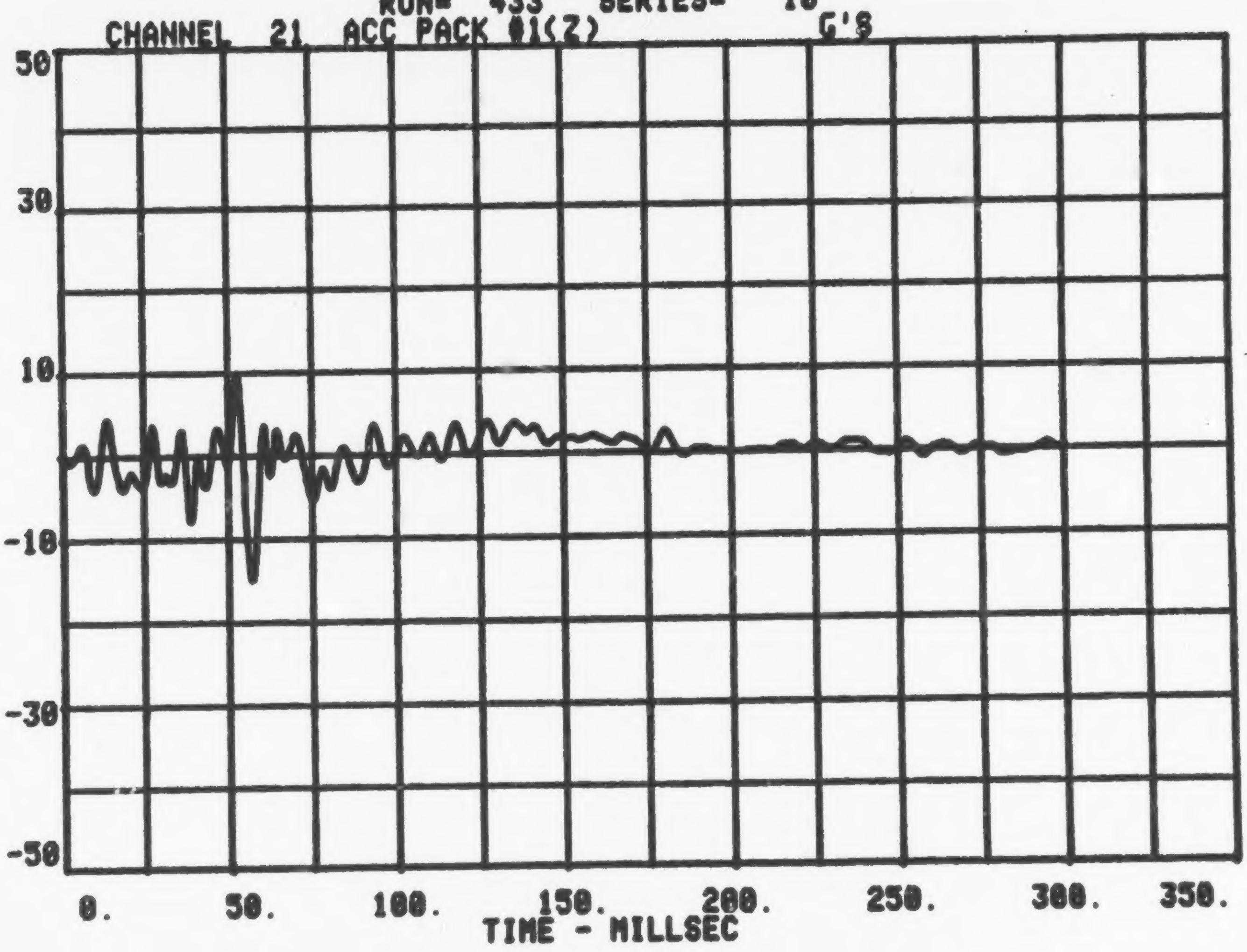
6440-V-6



RUN= 433 SERIES= 10
CHANNEL 20 ACC PACK 01(Y) G'S
50
30
10
-10
-30
-50
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

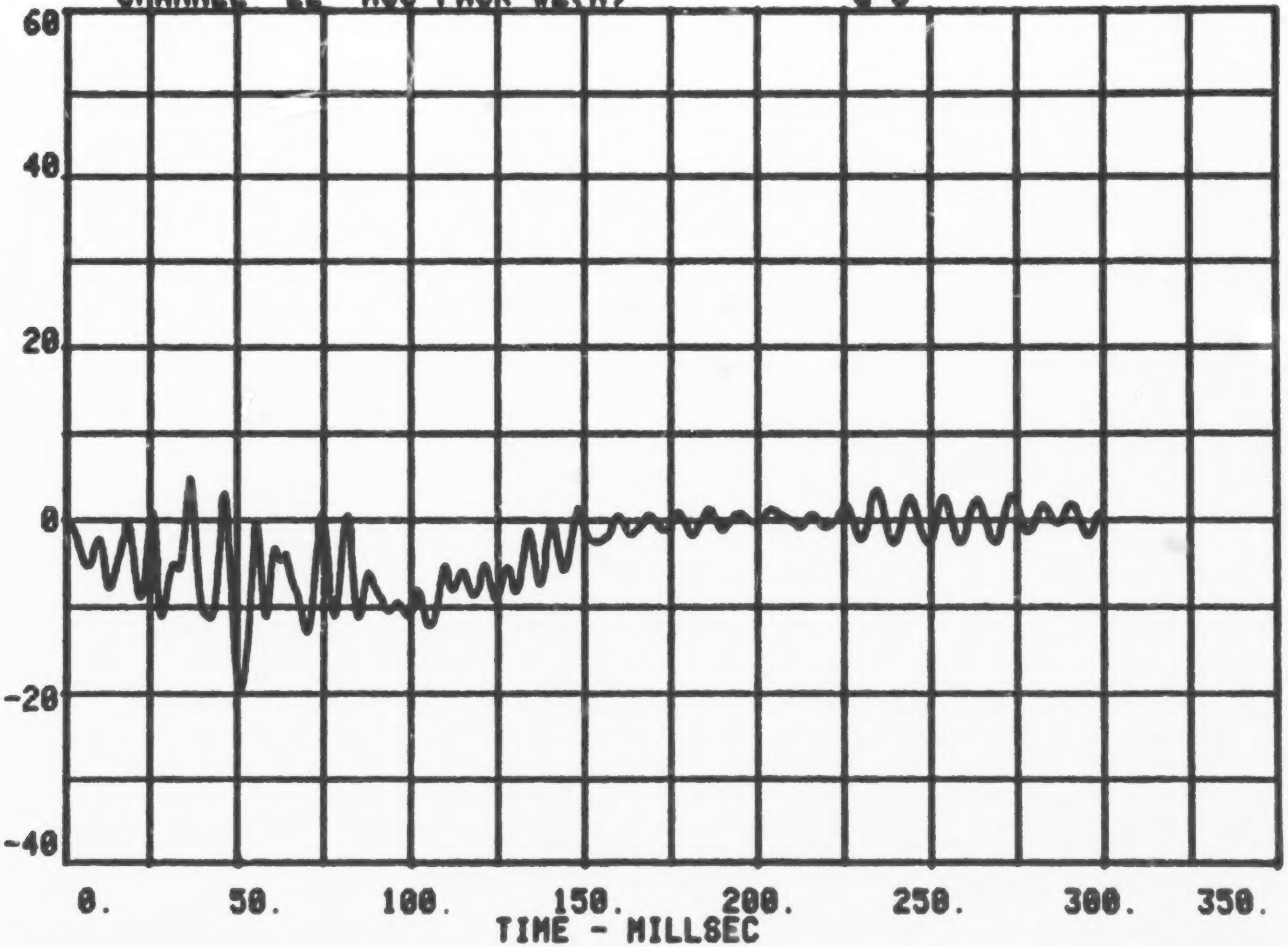
6440-V-6

741


RUN= 433 SERIES= 10
CHANNEL 21 ACC PACK #1(Z)
G'S
50
30
10
-10
-30
-50
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

RUN= 433 SERIES= 10
CHANNEL 22 ACC PACK #2(X) G'S

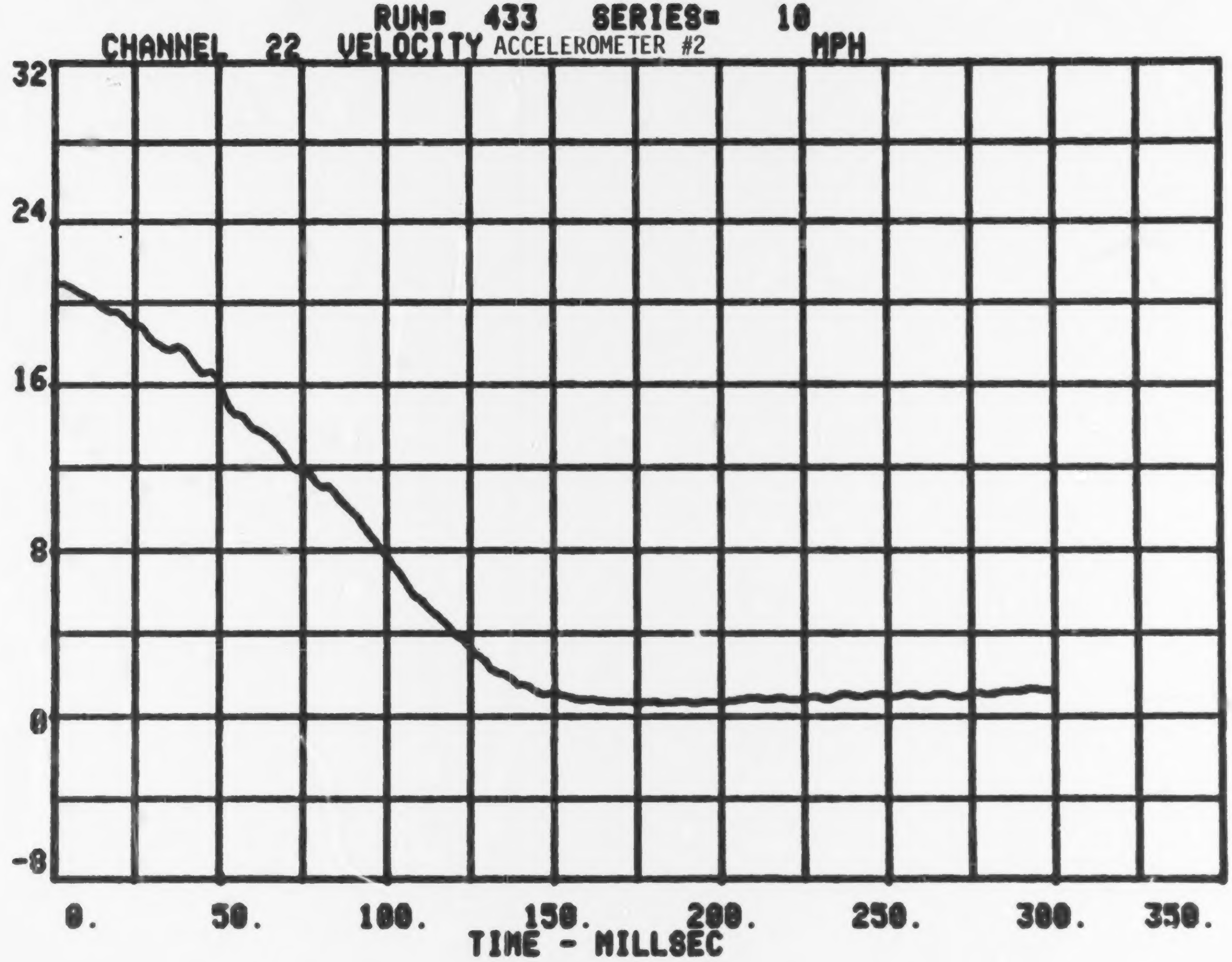


3

6440-V-6

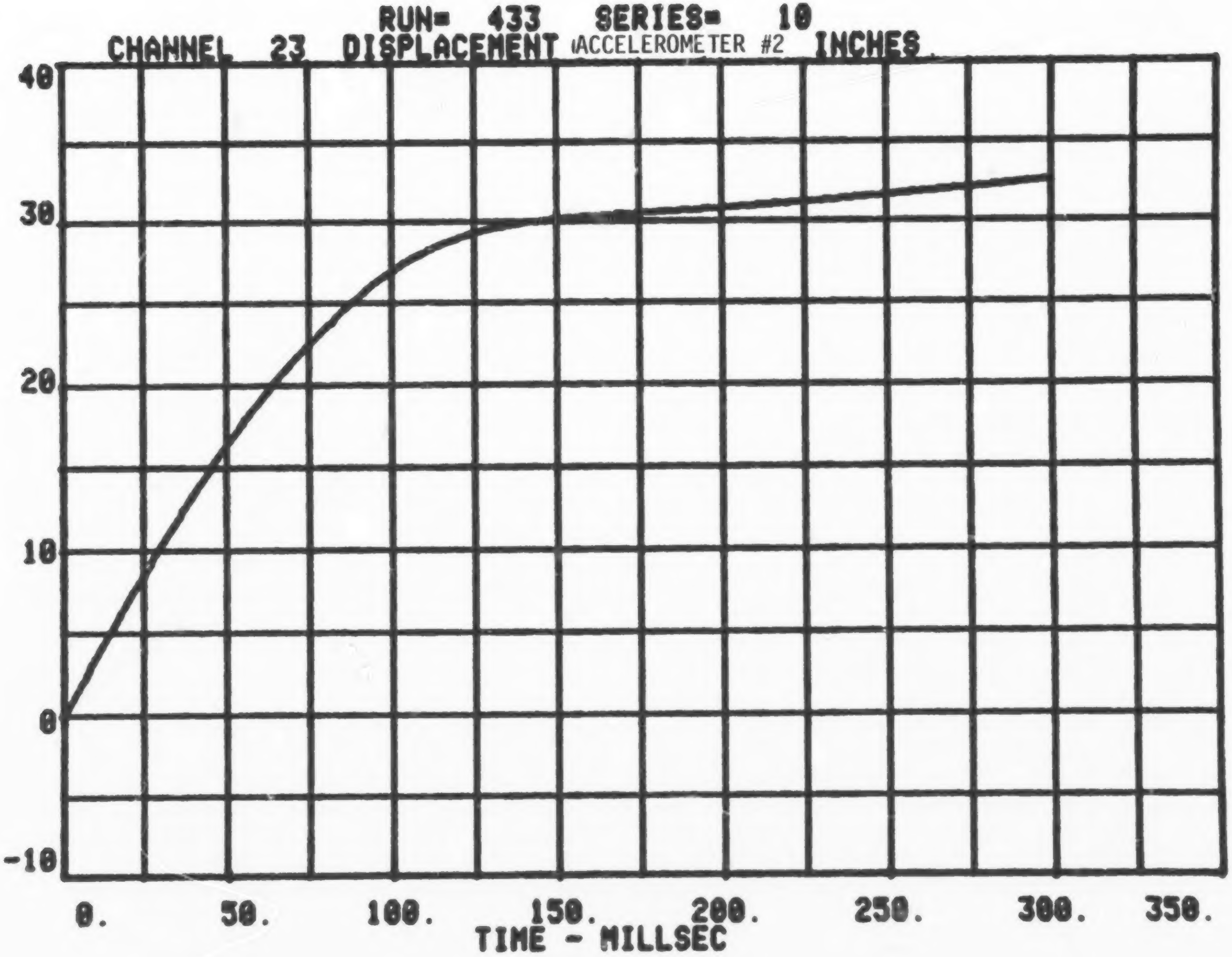
743

744



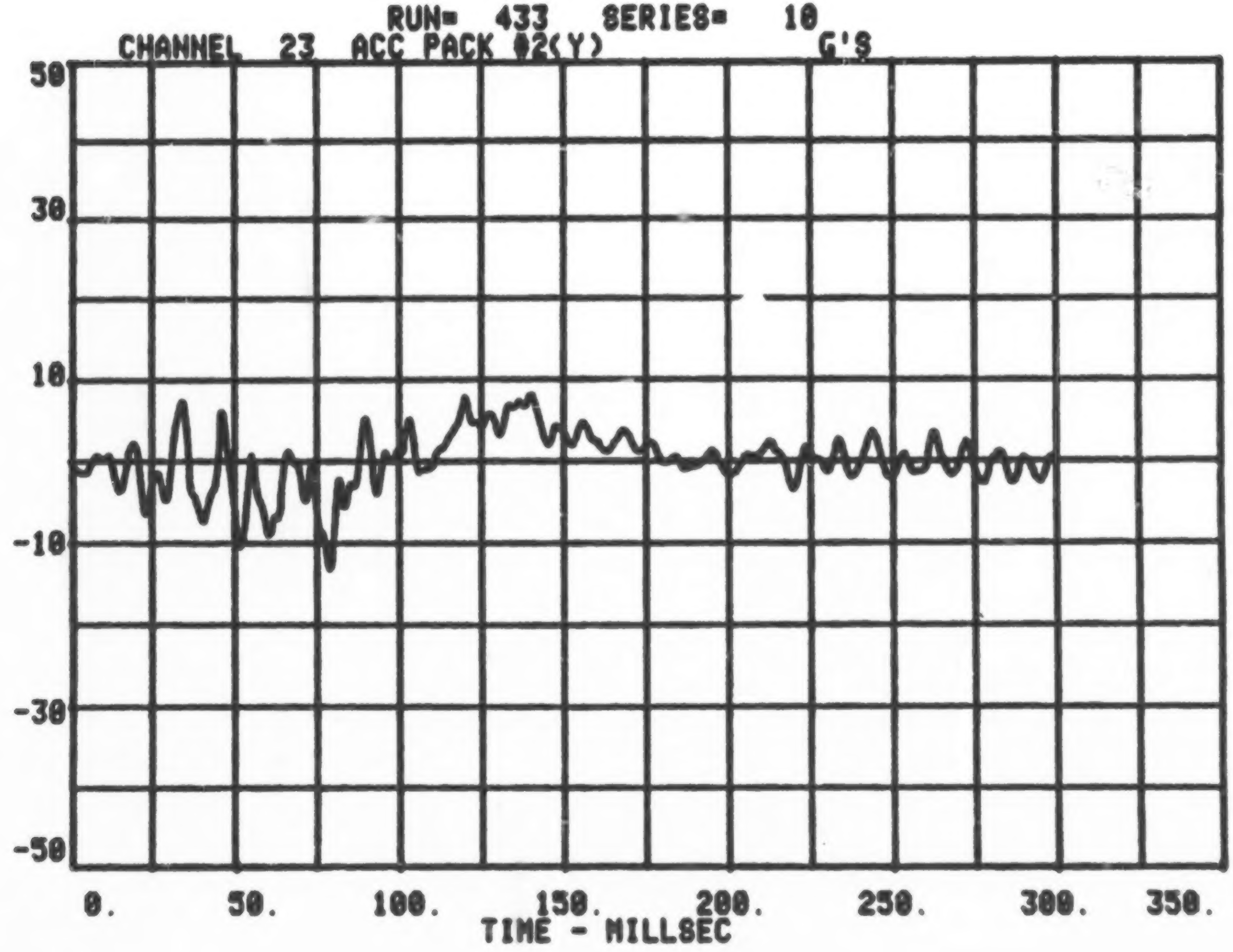
RUN= 433 SERIES= 10
CHANNEL 22 VELOCITY ACCELEROMETER #2 MPH

5440-V-6

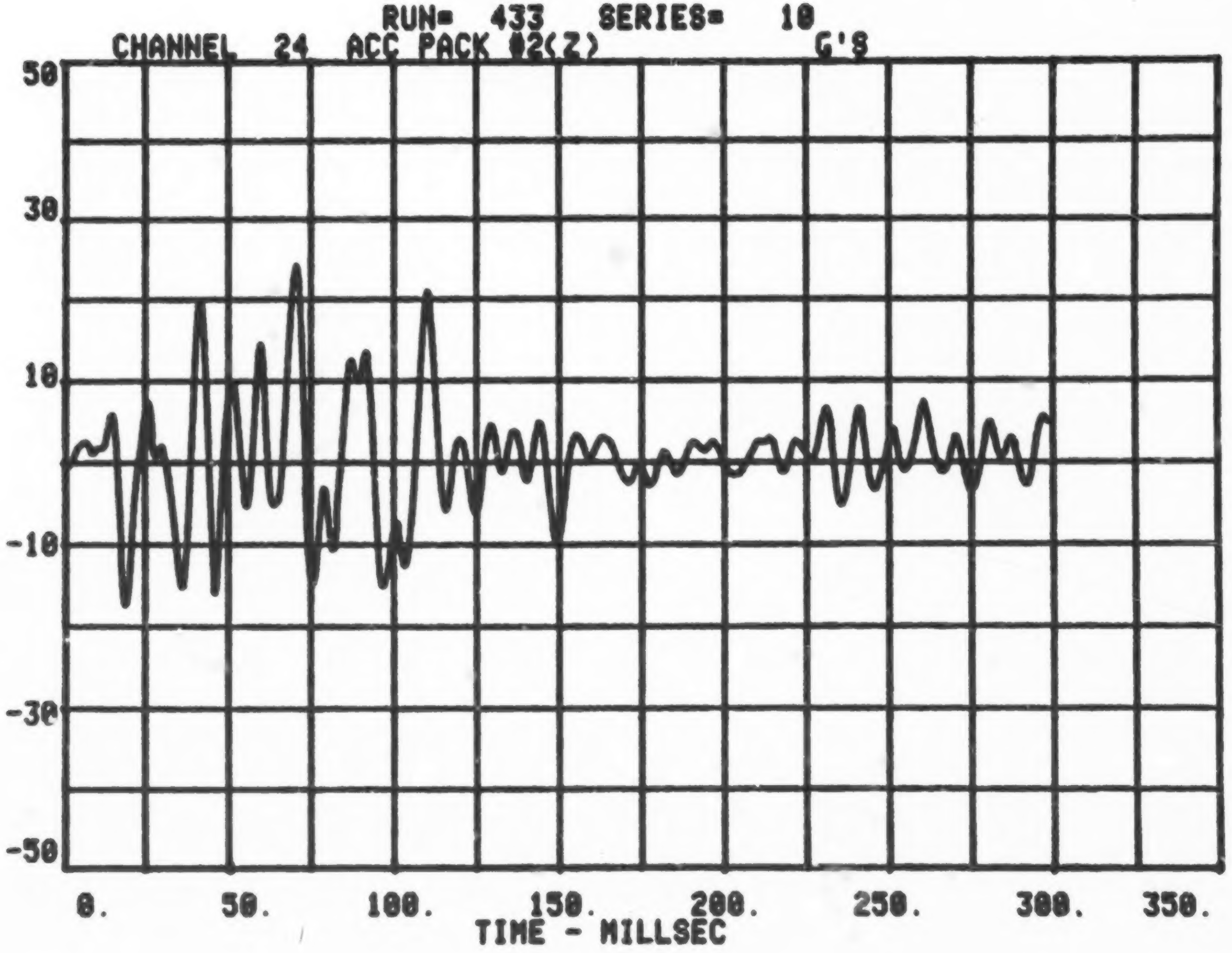

RUN= 433 SERIES= 10
CHANNEL 23 DISPLACEMENT ACCELEROMETER #2 INCHES
40
30
20
10
0
-10
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

746

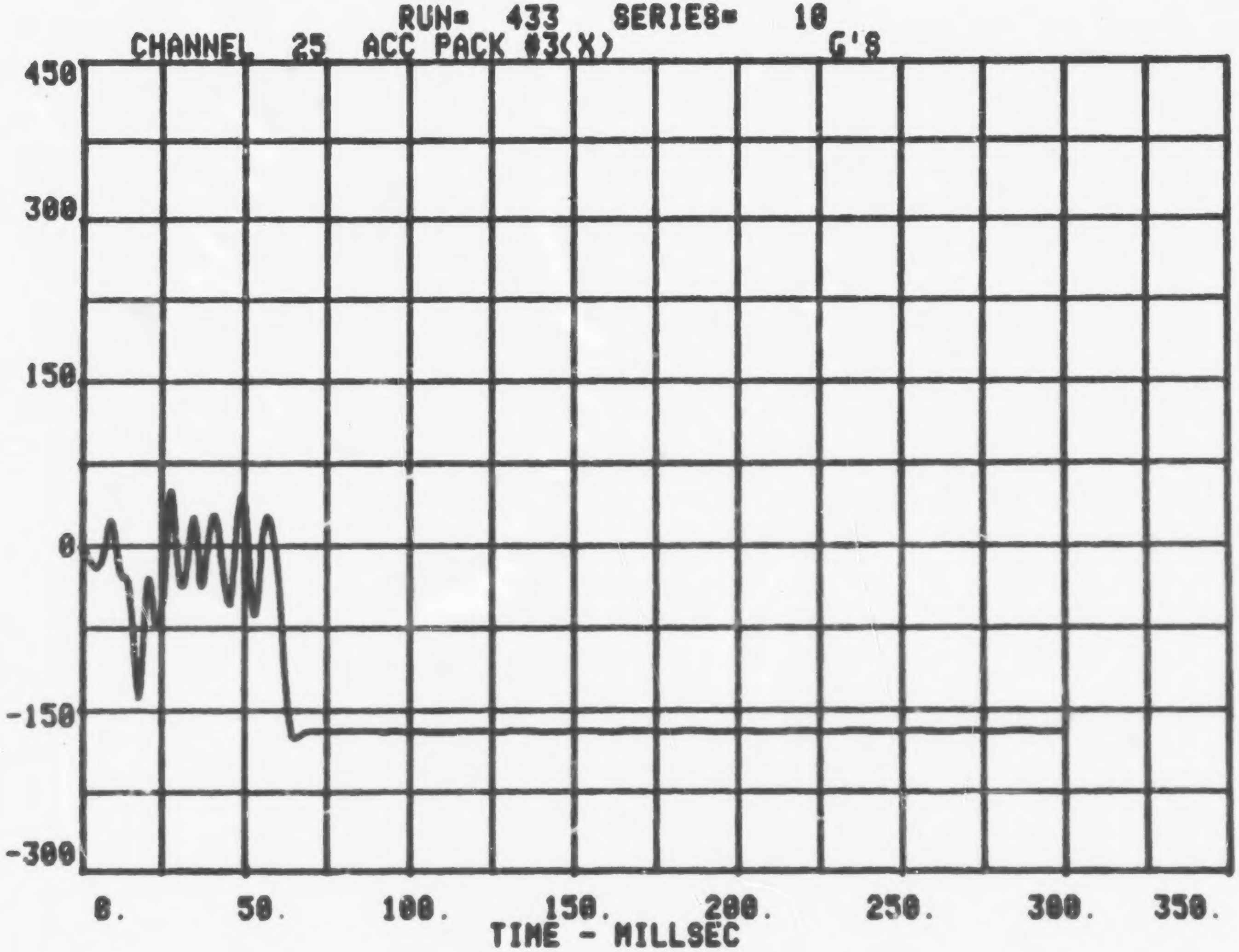

RUN= 433 SERIES= 10
CHANNEL 23 ACC PACK #2(Y) G'S
50
30
10
-10
-30
-50
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

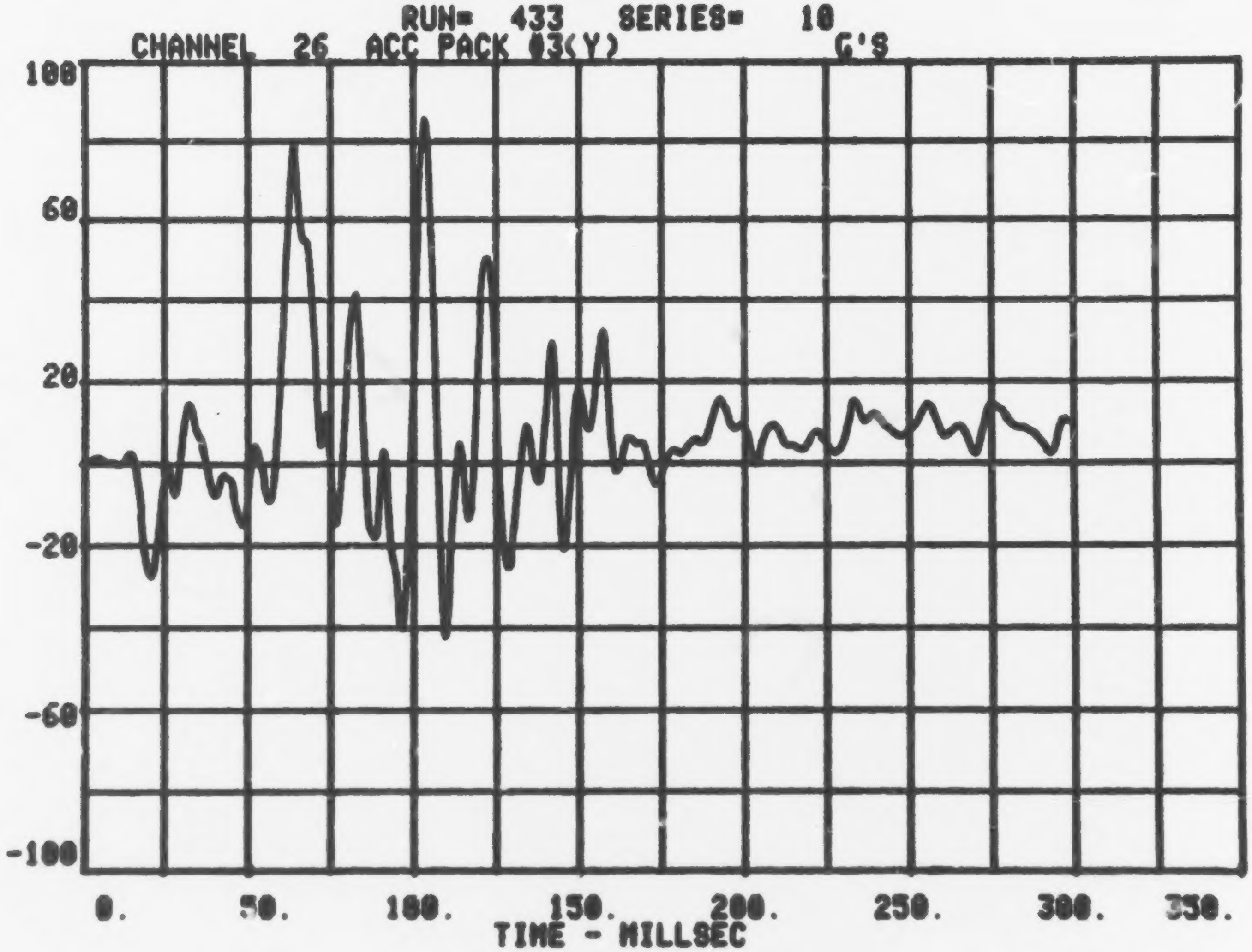

RUN= 433 SERIES= 10
CHANNEL 24 ACC PACK #2(Z) G'S
50
30
10
-10
-30
-50
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

748


RUN= 433 SERIES= 10
CHANNEL 25 ACC PACK #3(X)
G'S
450
300
150
0
-150
-300
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

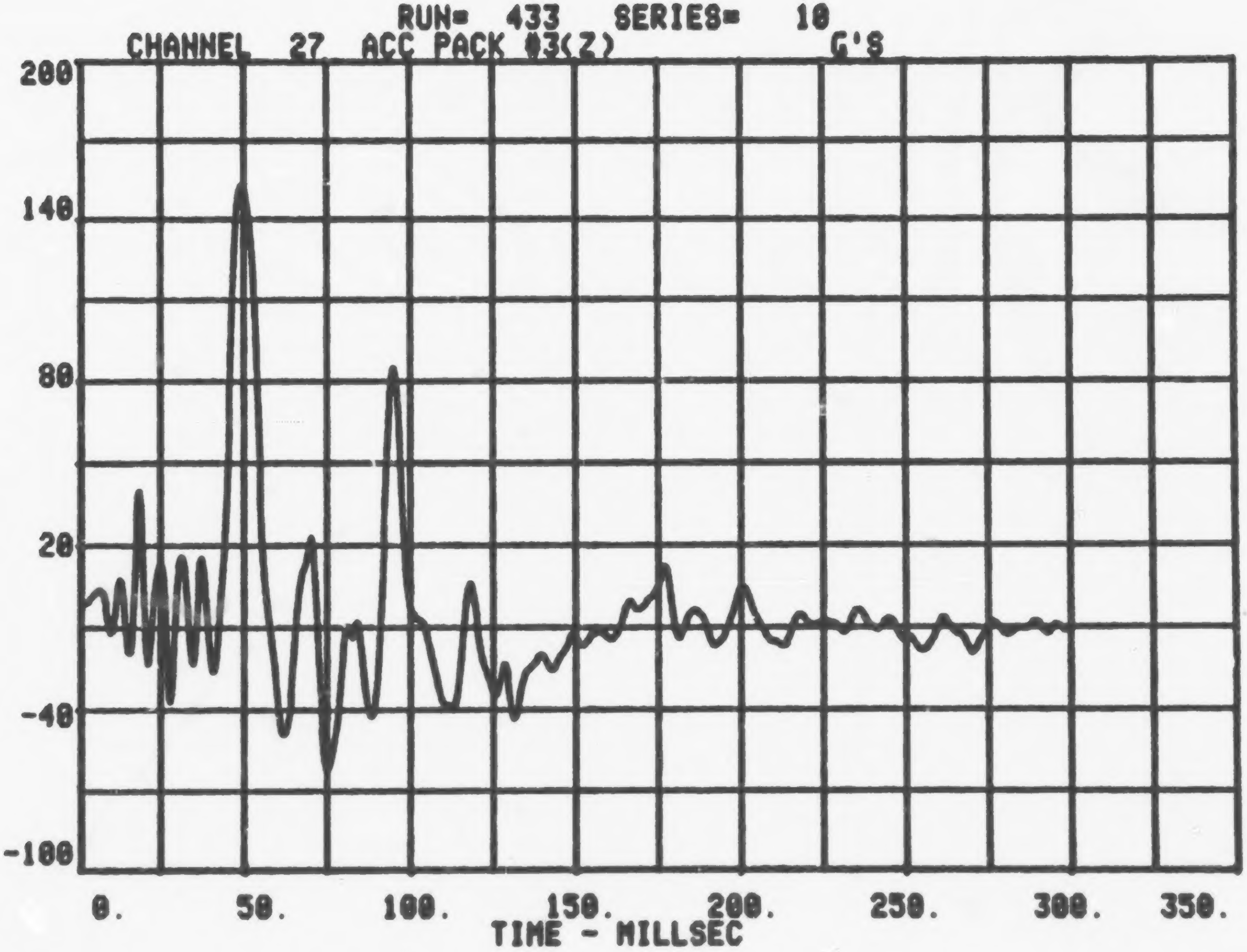
6440-V-6

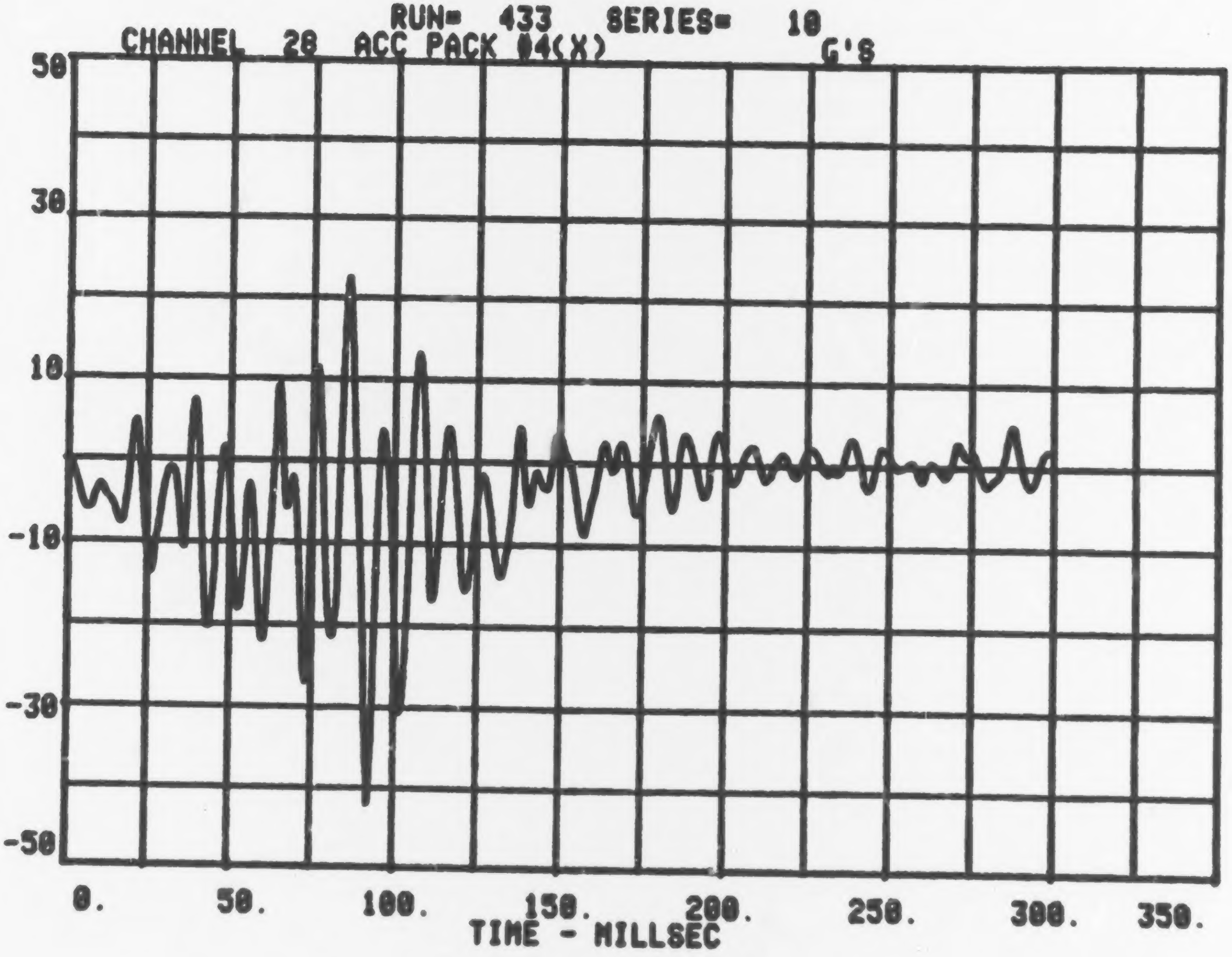

RUN= 433 SERIES= 10
CHANNEL 26 ACC PACK #3(Y) G'S
100
60
20
-20
-60
-100
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

749

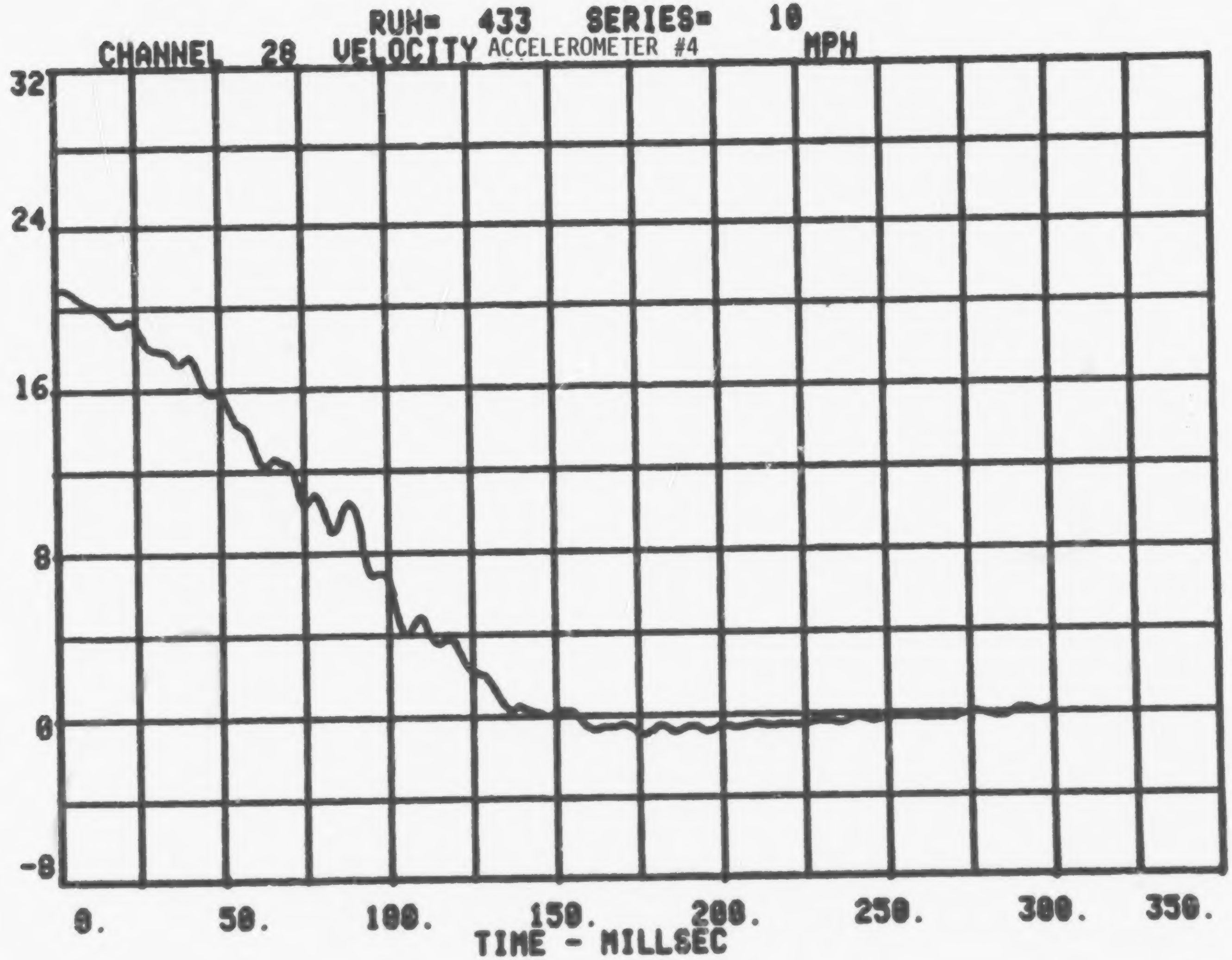
750


RUN= 433 SERIES= 10
CHANNEL 27 ACC PACK #3(Z) G'S
200
140
80
20
-40
-100
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

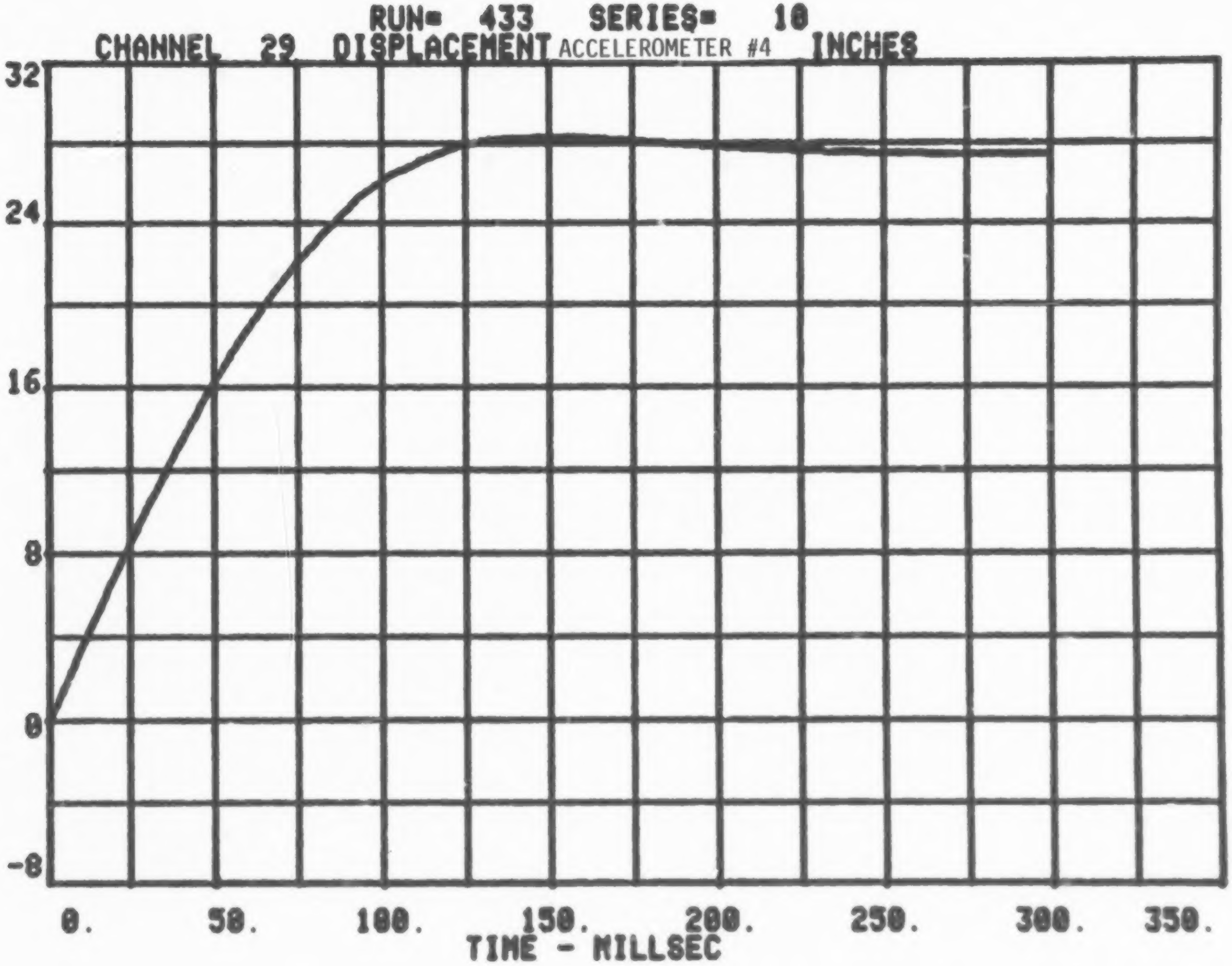

RUN= 433 SERIES= 10
CHANNEL 28 ACC PACK #4(X)
G'S
50
30
10
-10
-30
-50
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

751

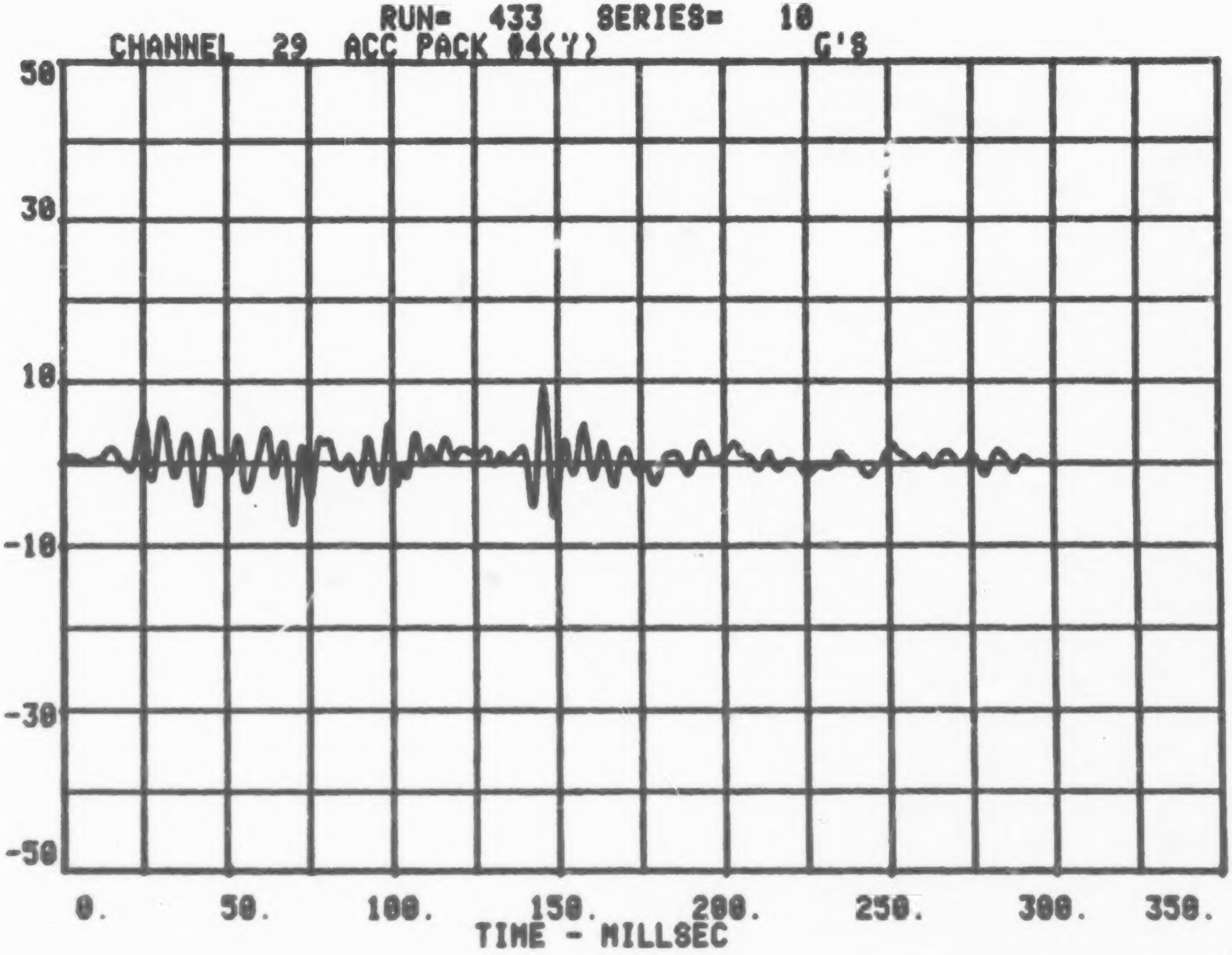

RUN= 433 SERIES= 10
CHANNEL 28 VELOCITY ACCELEROMETER #4 MPH
32
24
16
8
0
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

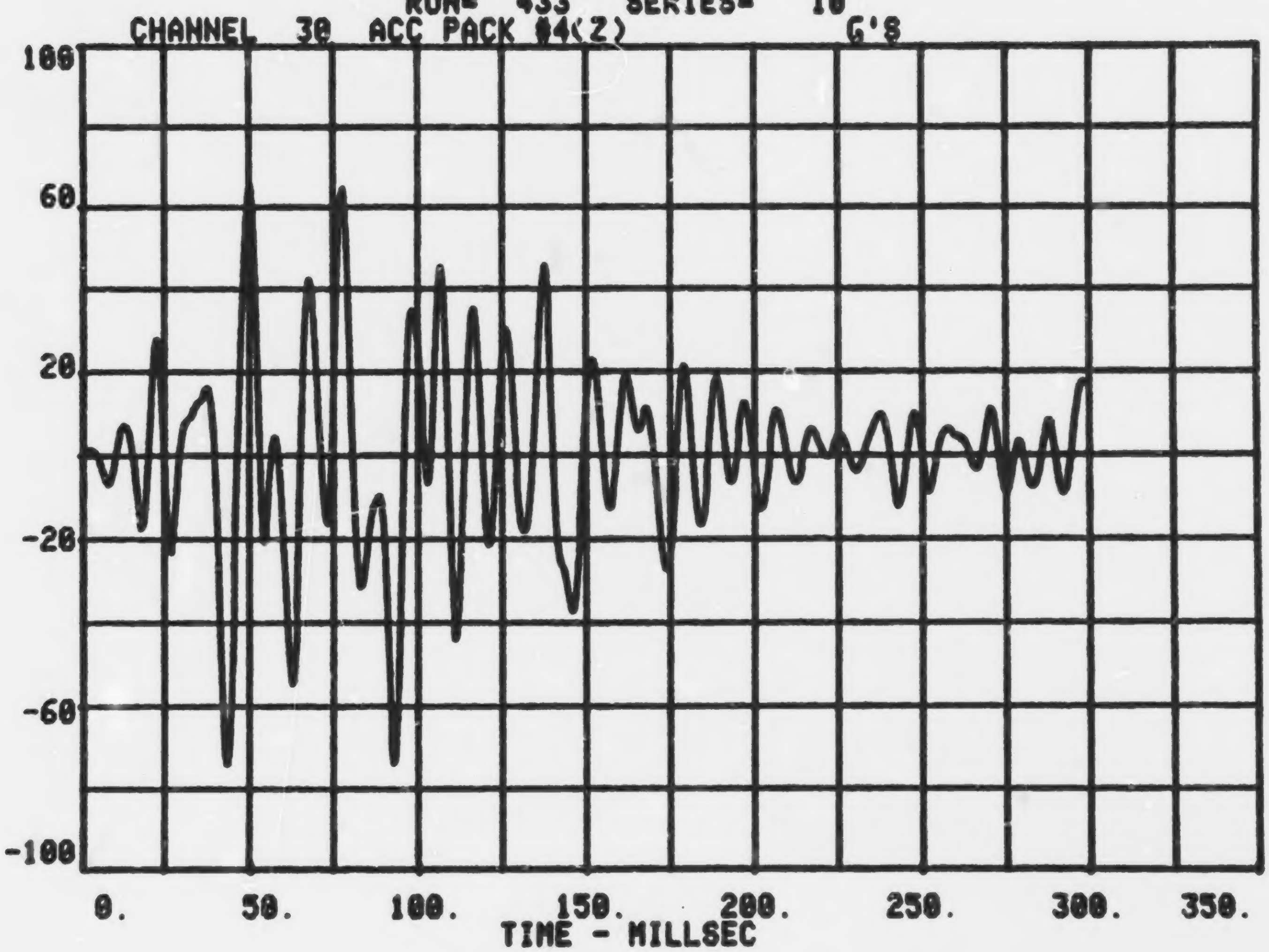

RUN= 433 SERIES= 10
CHANNEL 29 DISPLACEMENT ACCELEROMETER #4 INCHES

6440-V-6

754

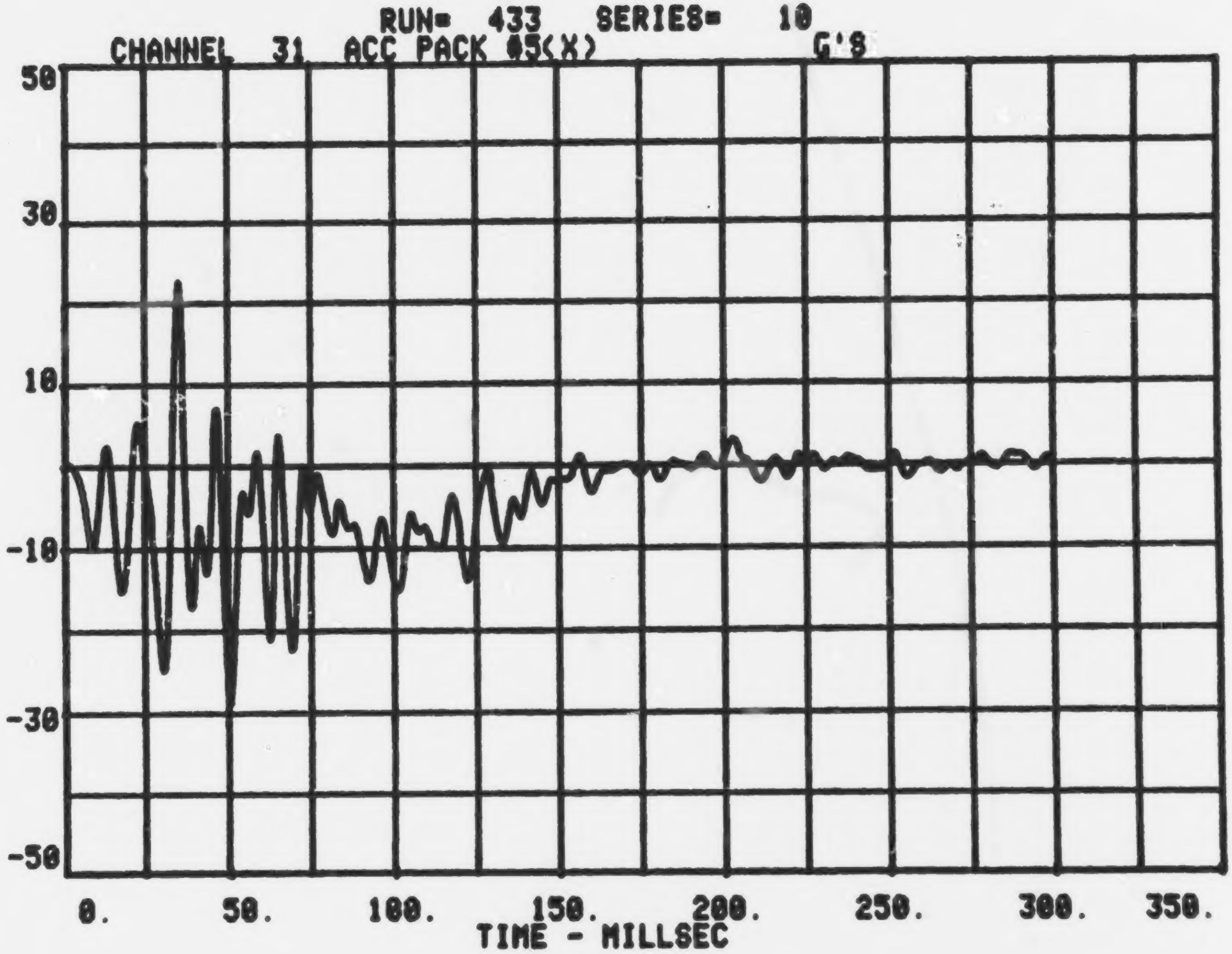

RUN= 433 SERIES= 10
CHANNEL 29 ACC PACK #4(Y) G'S
50
30
10
-10
-30
-50
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6400-V-6

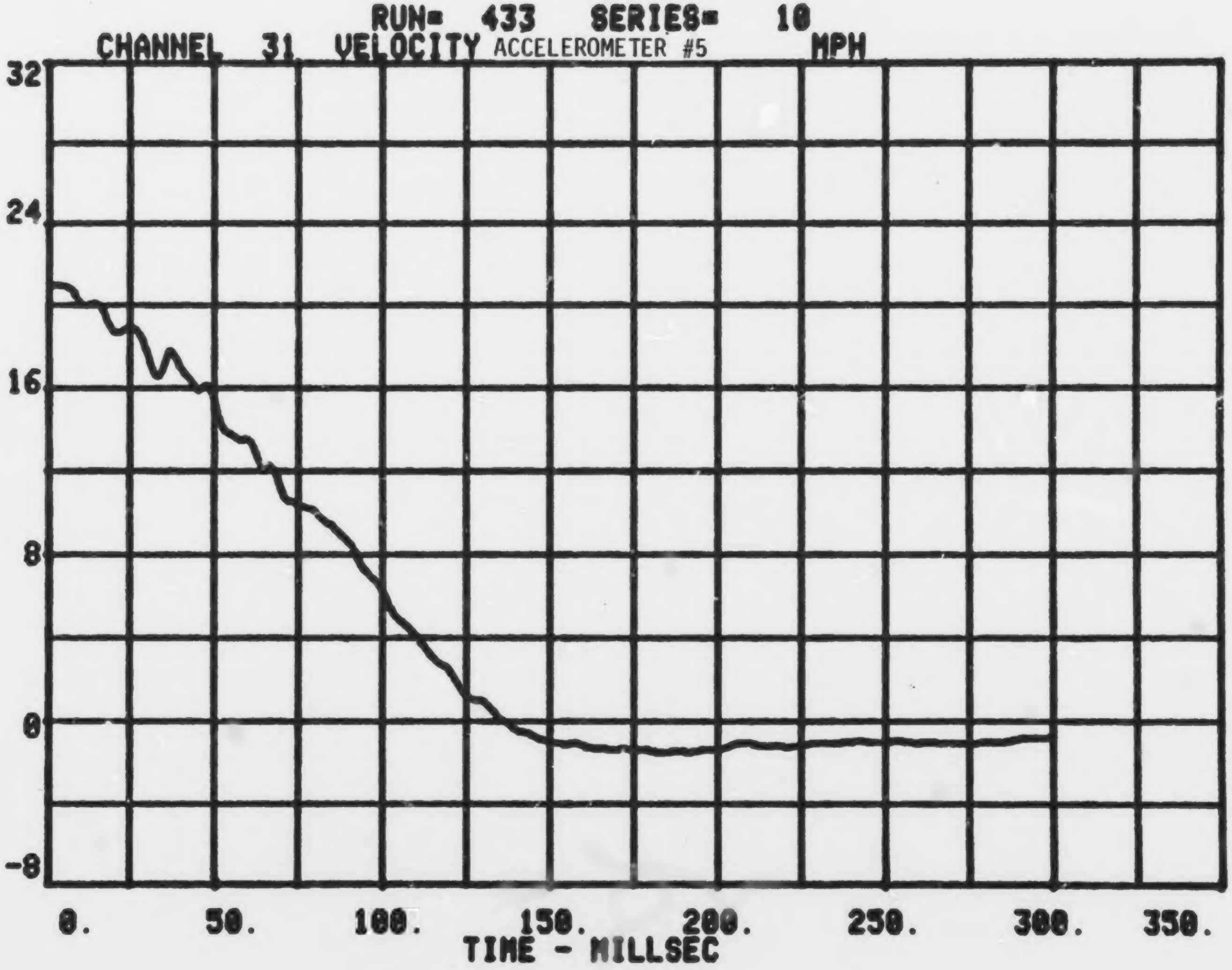

RUN= 433 SERIES= 10
CHANNEL 30 ACC PACK #4(Z) G'S
100
60
20
-20
-60
-100
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

756


RUN= 433 SERIES= 10
CHANNEL 31 ACC PACK #5(X)
G'S
50
30
10
-10
-30
-50
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

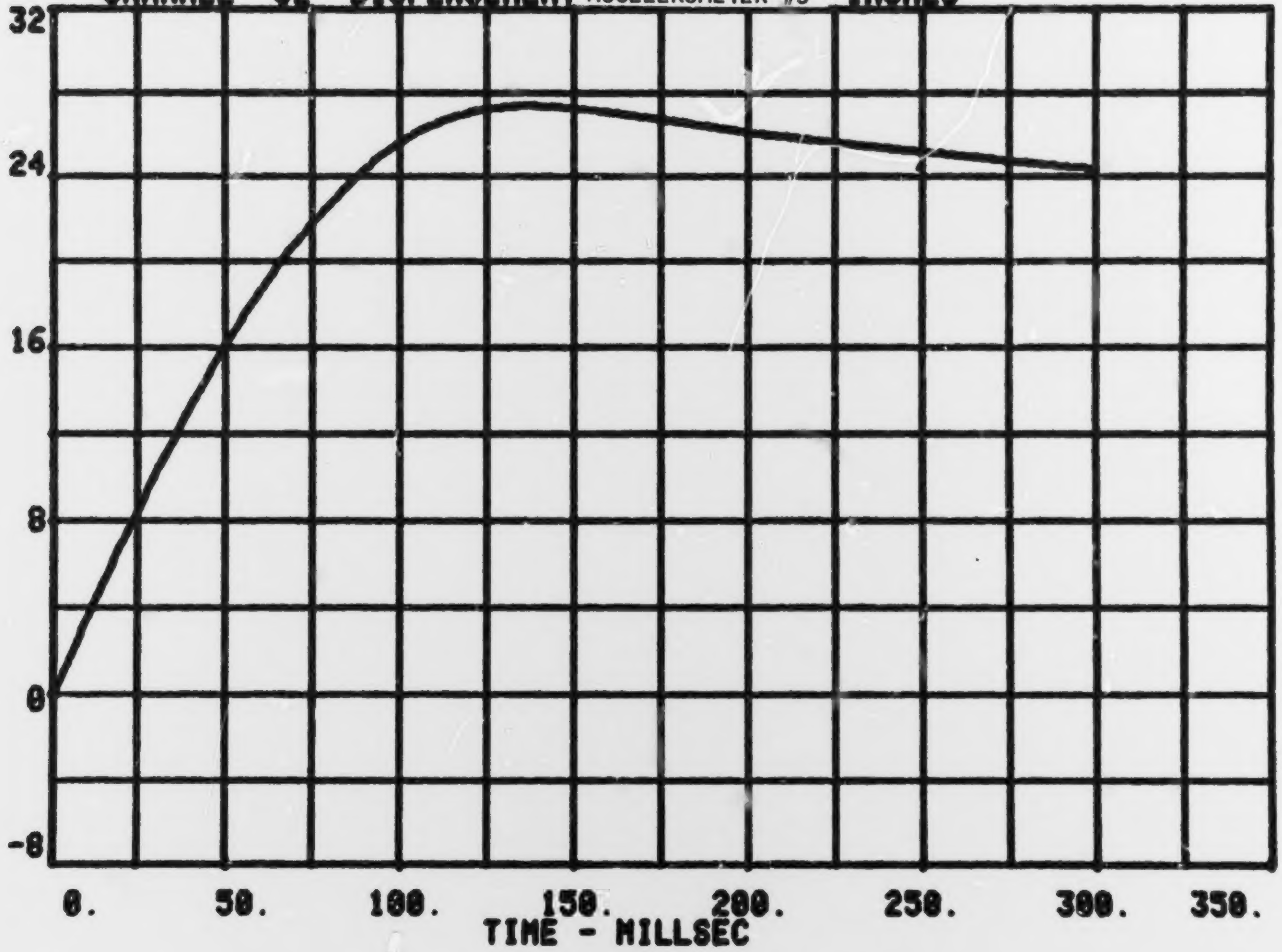
6440-V-6


RUN= 433 SERIES= 10
CHANNEL 31 VELOCITY ACCELEROMETER #5 MPH
32
24
16
8
0
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

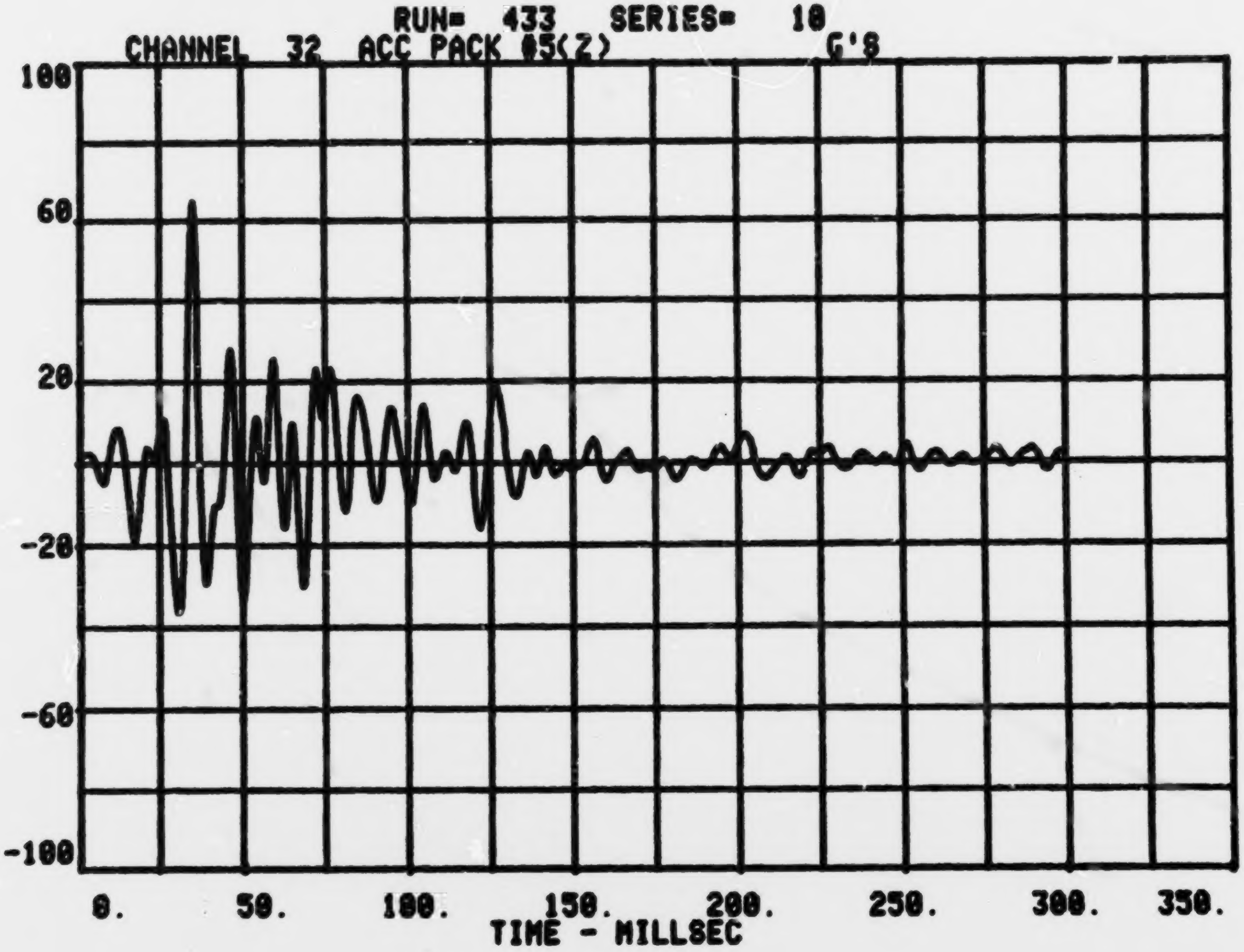
6440-V-6

RUN= 433 SERIES= 10

CHANNEL 32 DISPLACEMENT ACCELEROMETER #5 INCHES



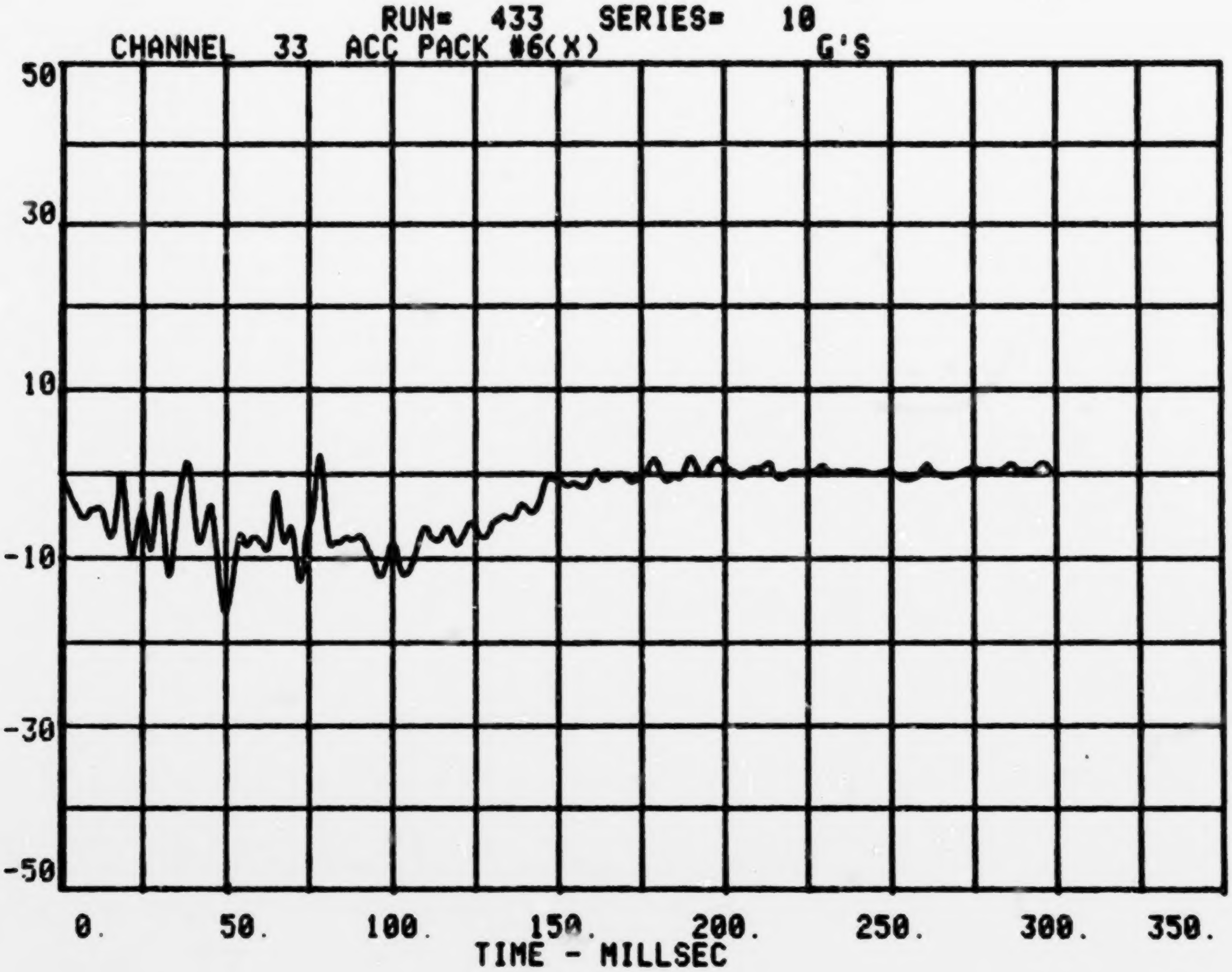
6440-V-6


RUN= 433 SERIES= 10
CHANNEL 32 ACC PACK #5(Z) G'S
100
60
20
-20
-60
-100
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

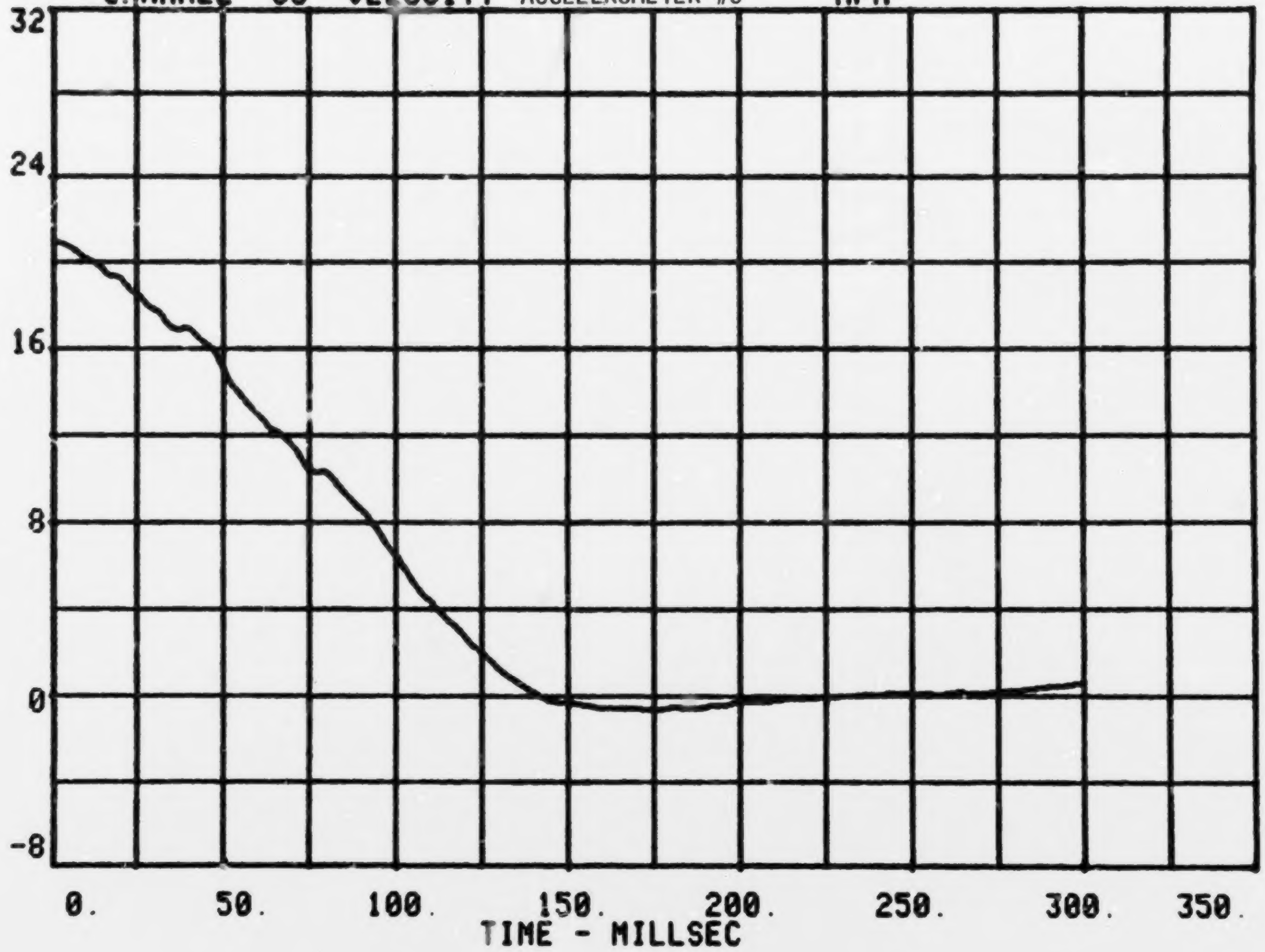
759

760


RUN= 433 SERIES= 10
CHANNEL 33 ACC PACK #6(X)
G'S
50
30
10
-10
-30
-50
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

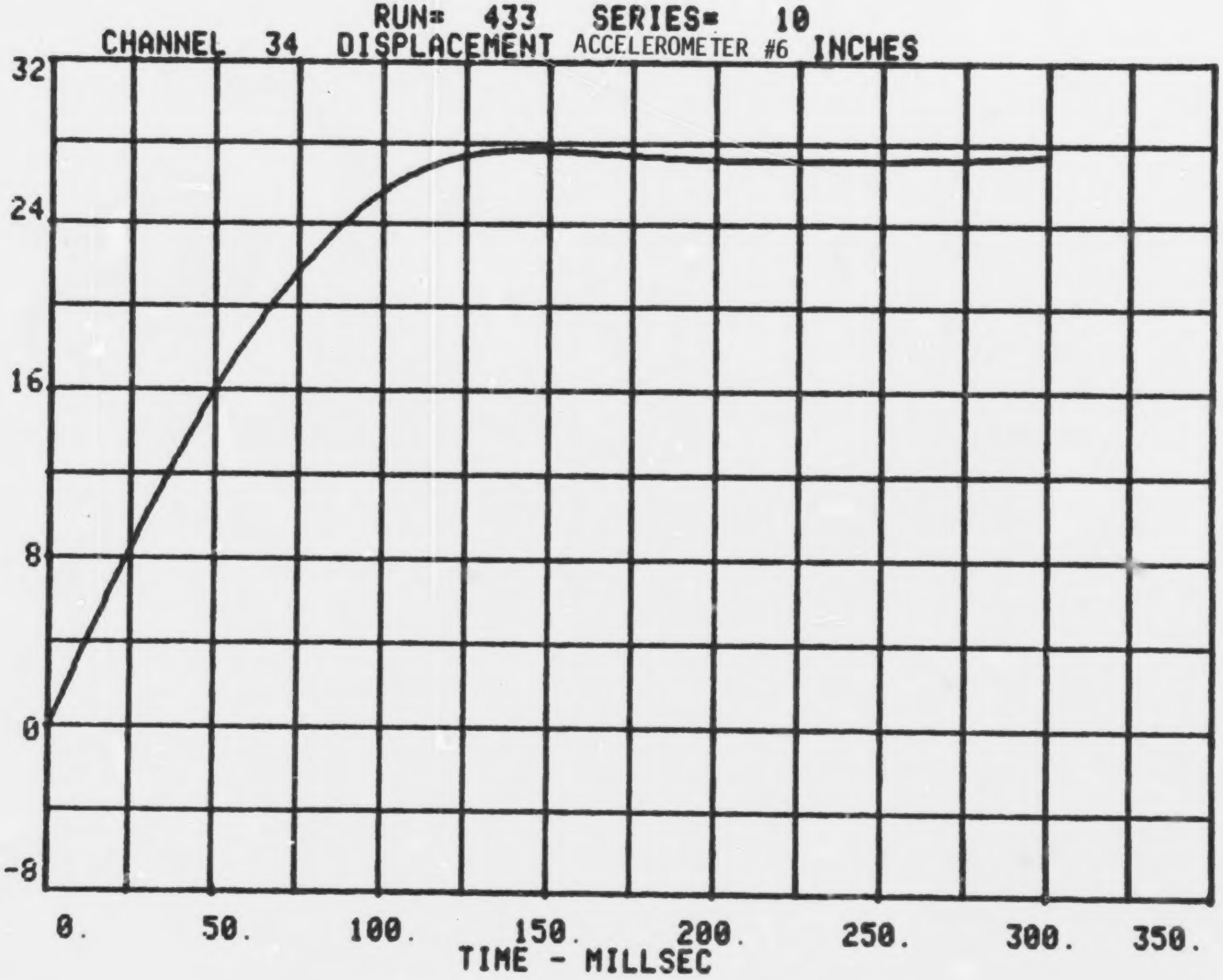
6440-V-6

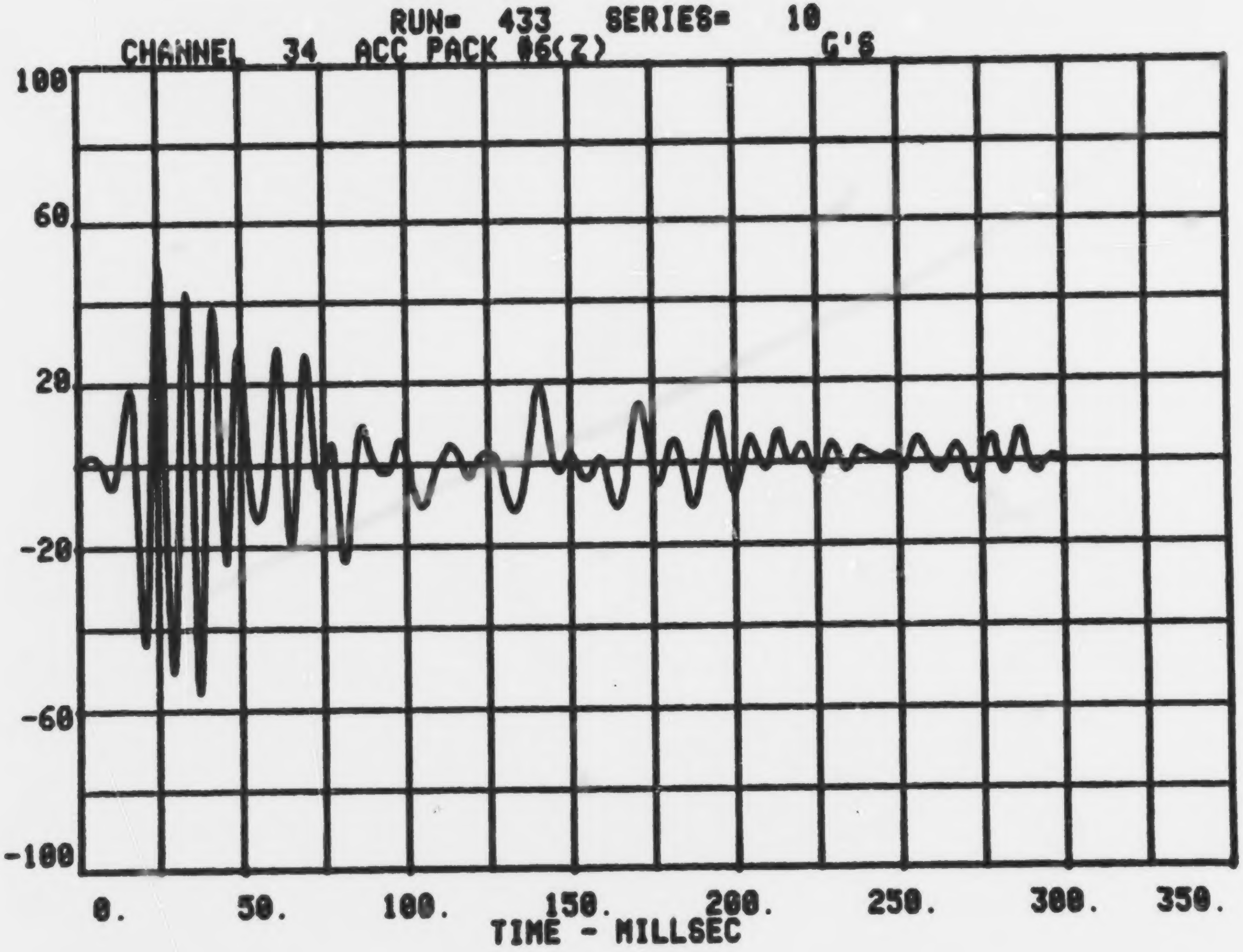
RUN= 433 SERIES= 10
CHANNEL 33 VELOCITY ACCELEROMETER #6 MPH



6440-V-6

761

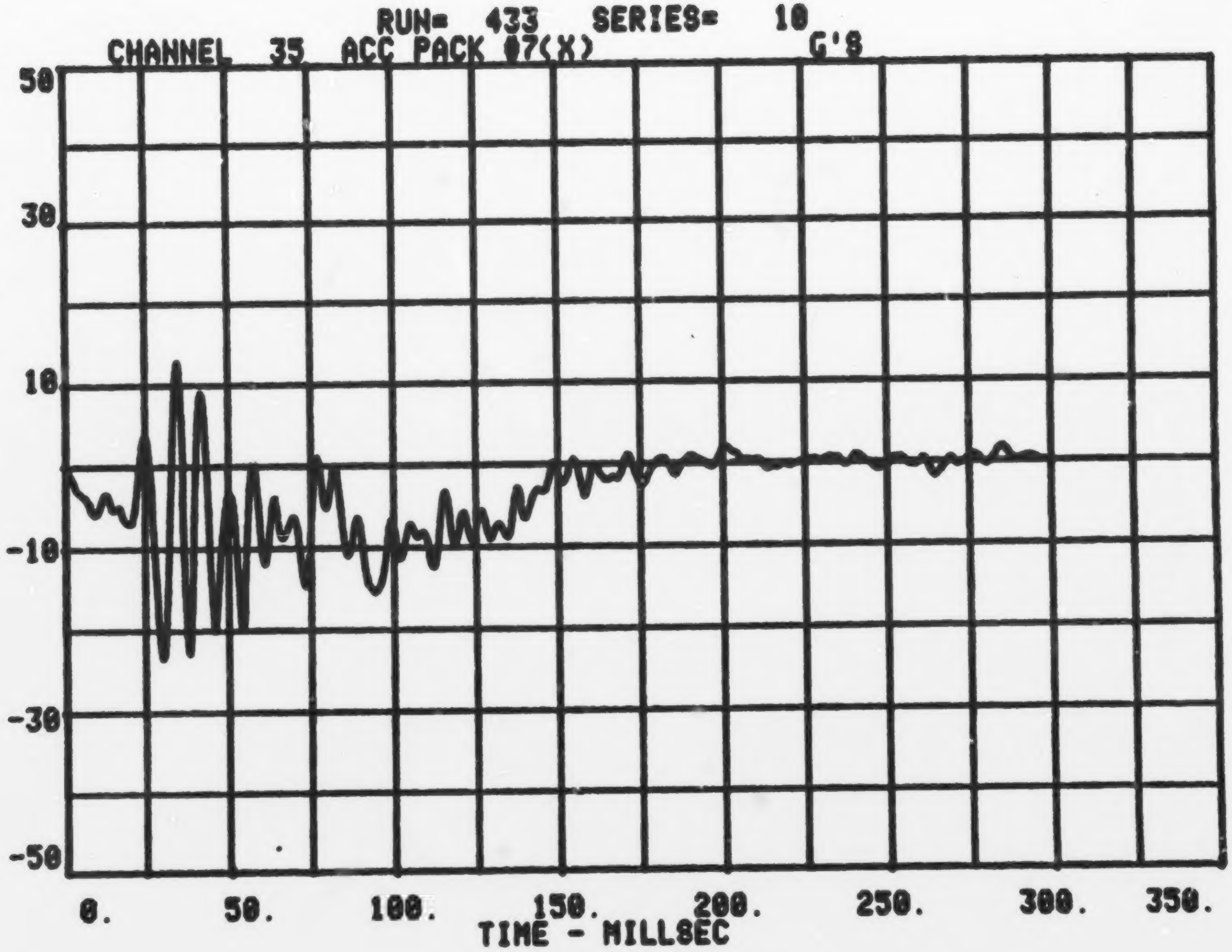

RUN= 433 SERIES= 10
CHANNEL 34 DISPLACEMENT ACCELEROMETER #6 INCHES
32
24
16
8
0
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

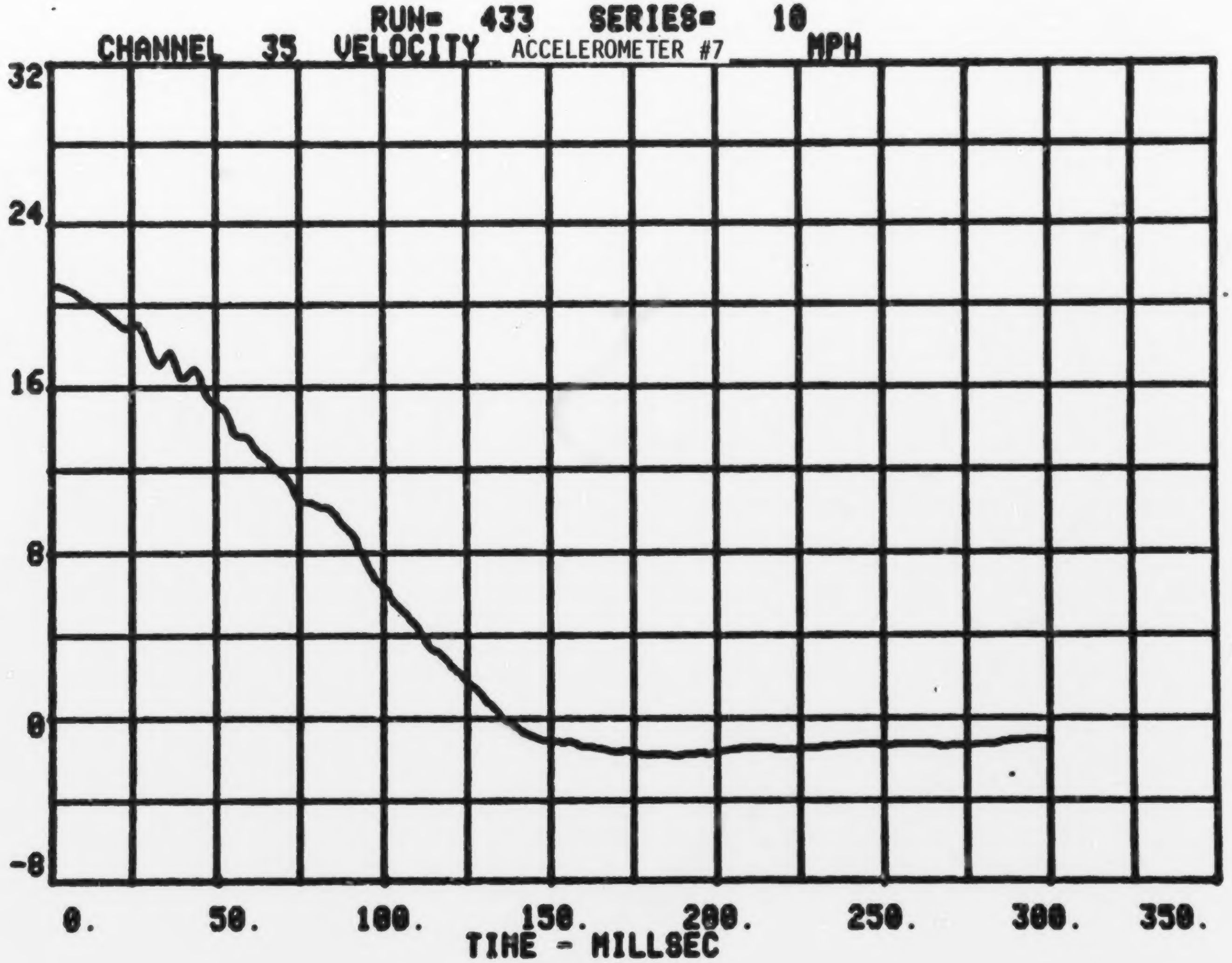

RUN= 433 SERIES= 10
CHANNEL 34 ACC PACK 06(Z)
G'S
100
60
20
-20
-60
-100
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

763

764


RUN= 433 SERIES= 10
CHANNEL 35 ACC PACK 07(X)
G'S
50
30
10
-10
-30
-50
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC


RUN= 433 SERIES= 10
CHANNEL 35 VELOCITY ACCELEROMETER #7 MPH
32
24
16
8
0
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

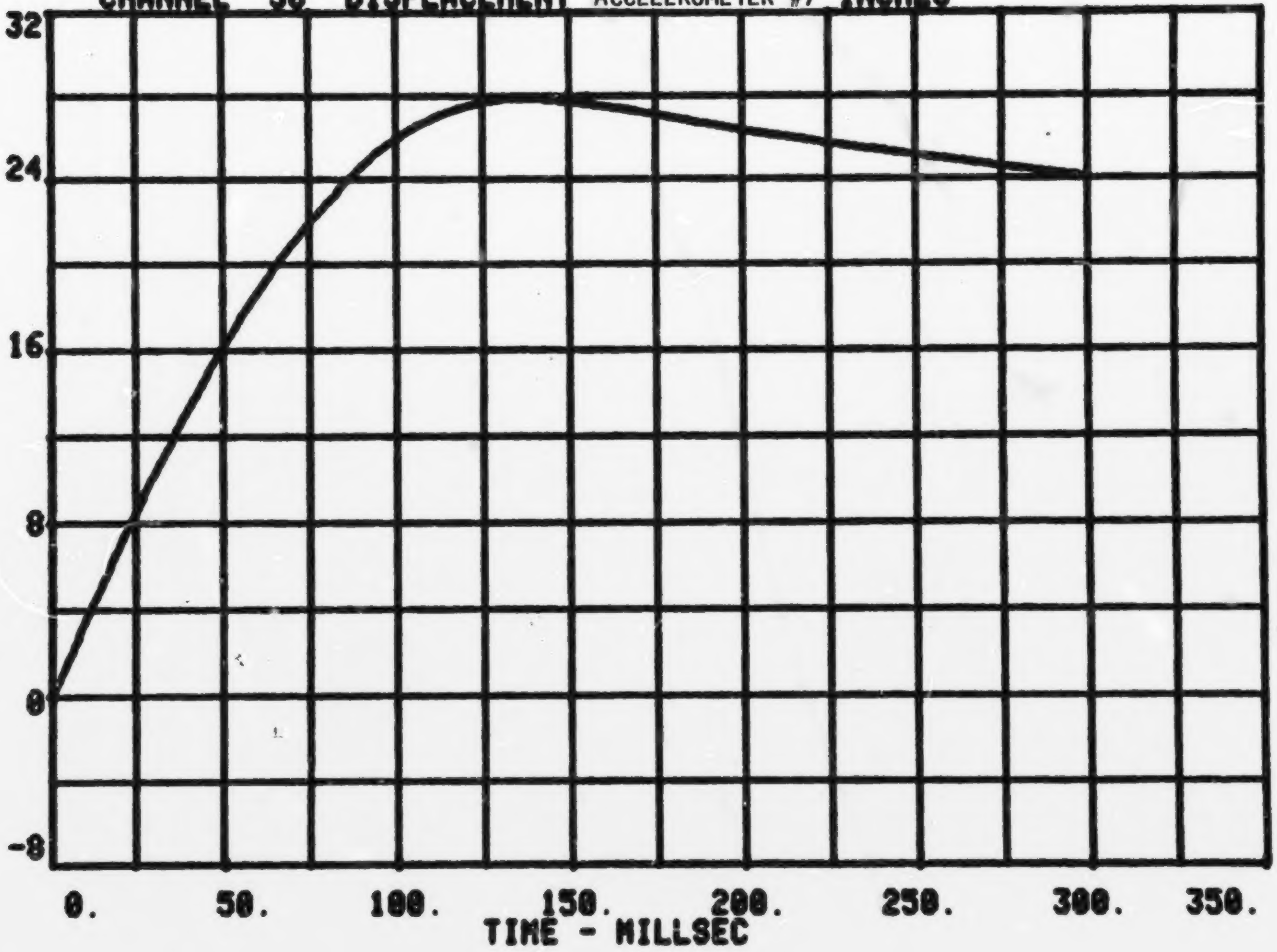
6440-V-6

765

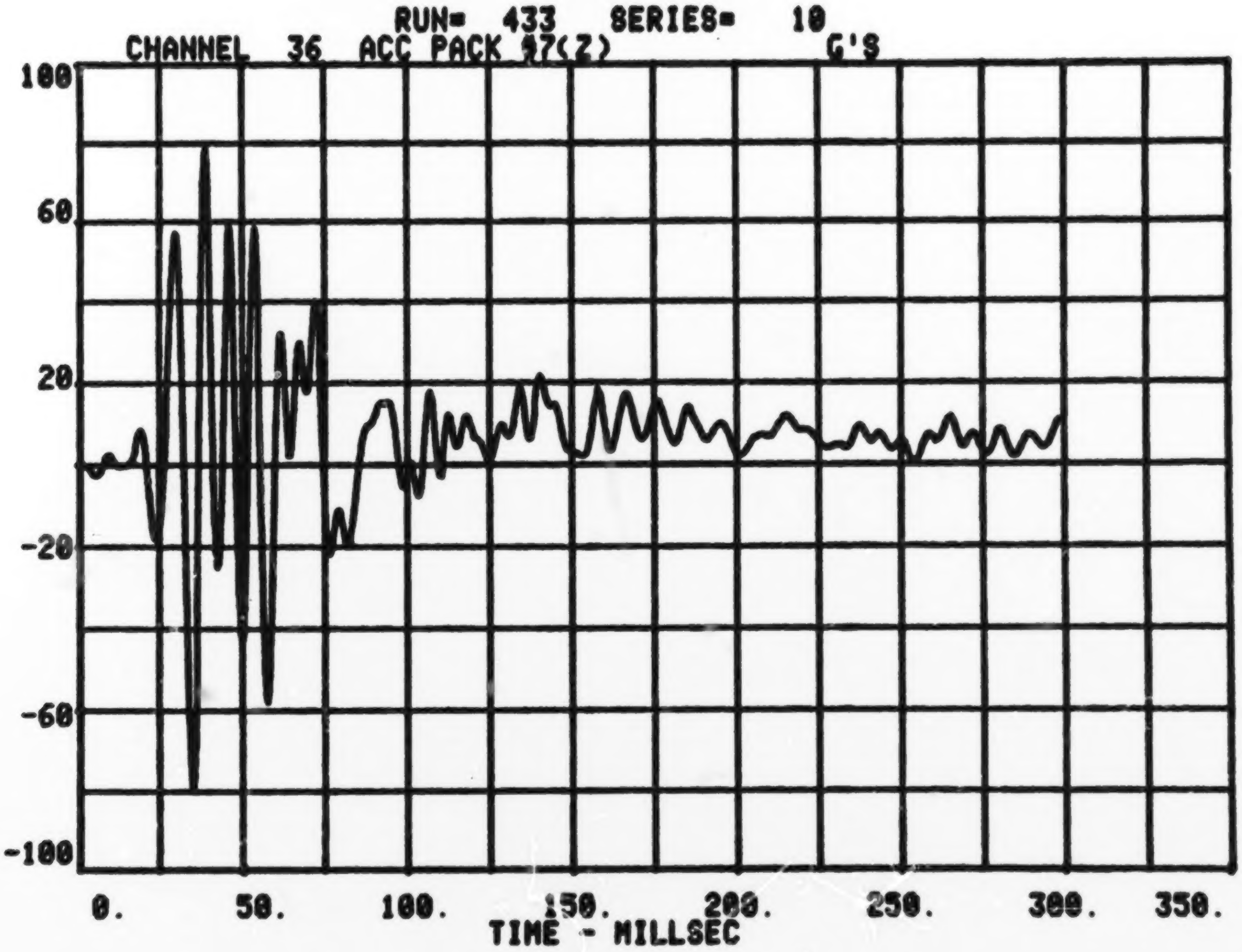
766

RUN= 433 SERIES= 10

CHANNEL 36 DISPLACEMENT ACCELEROMETER #7 INCHES



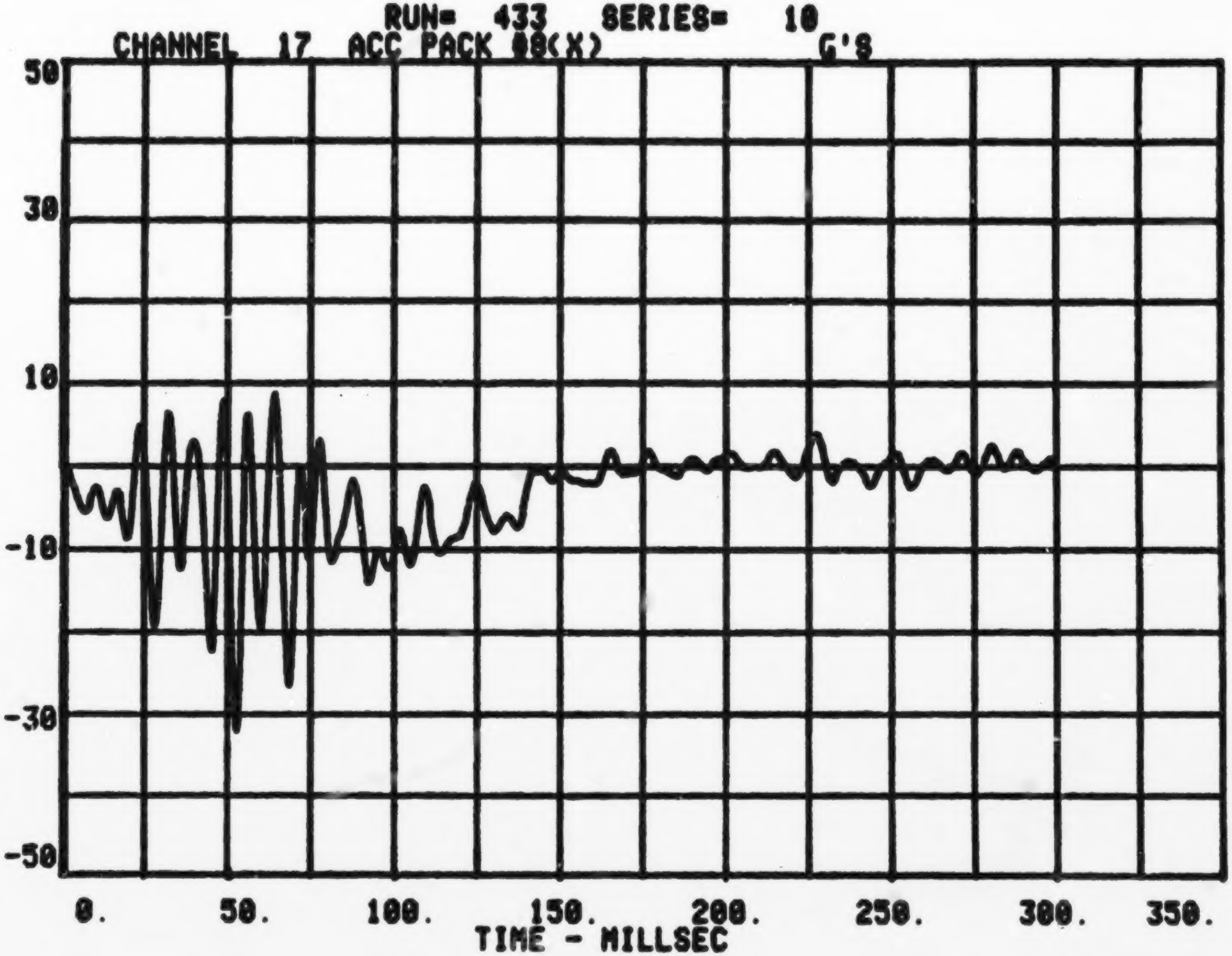
6440-V-6


RUN= 433 SERIES= 10
CHANNEL 36 ACC PACK 7(Z) G'S
100
60
20
-20
-60
-100
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

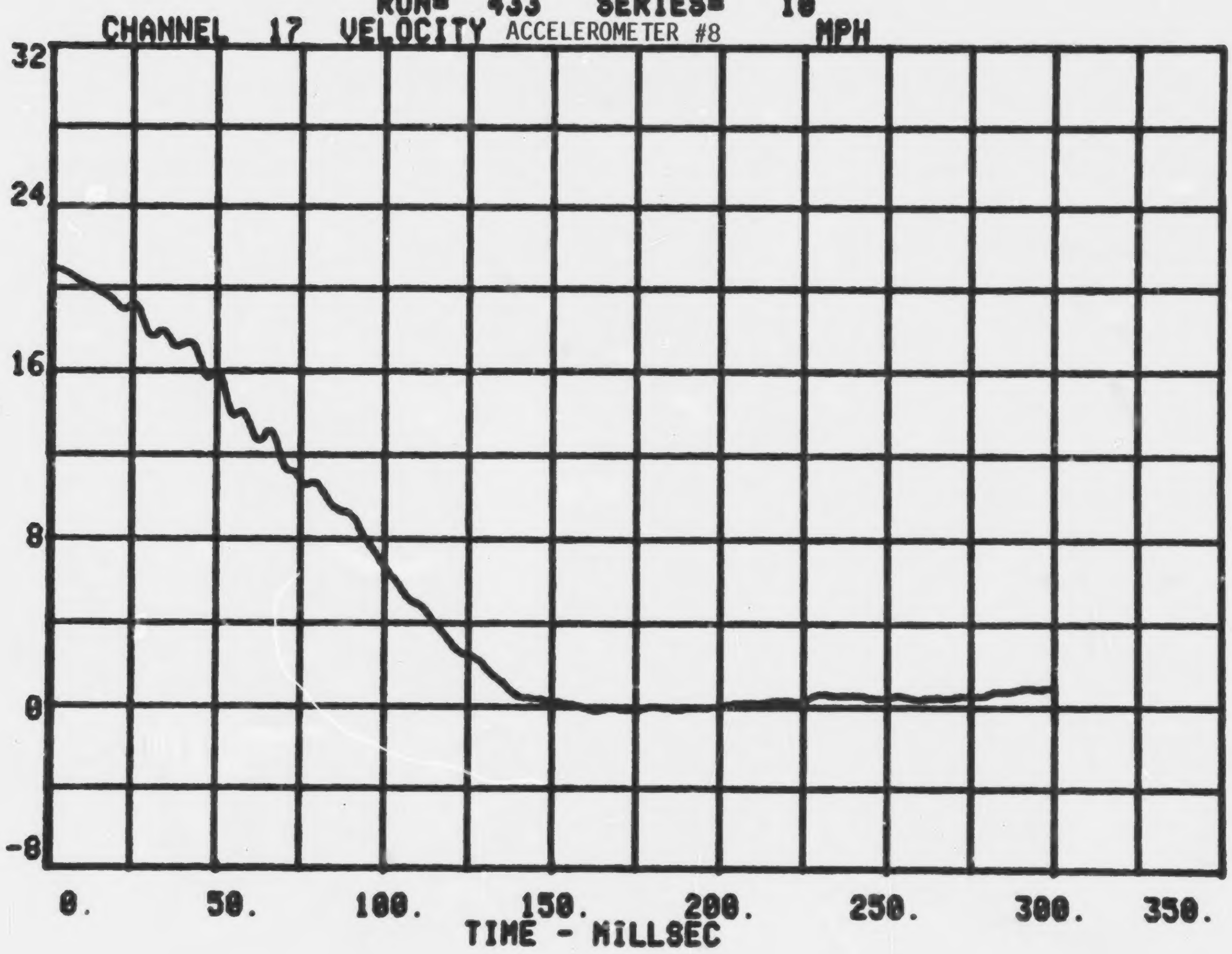
6440-V-6

767

768


RUN= 433 SERIES= 10
CHANNEL 17 ACC PACK 08(X)
G'S
50
30
10
-10
-30
-50
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

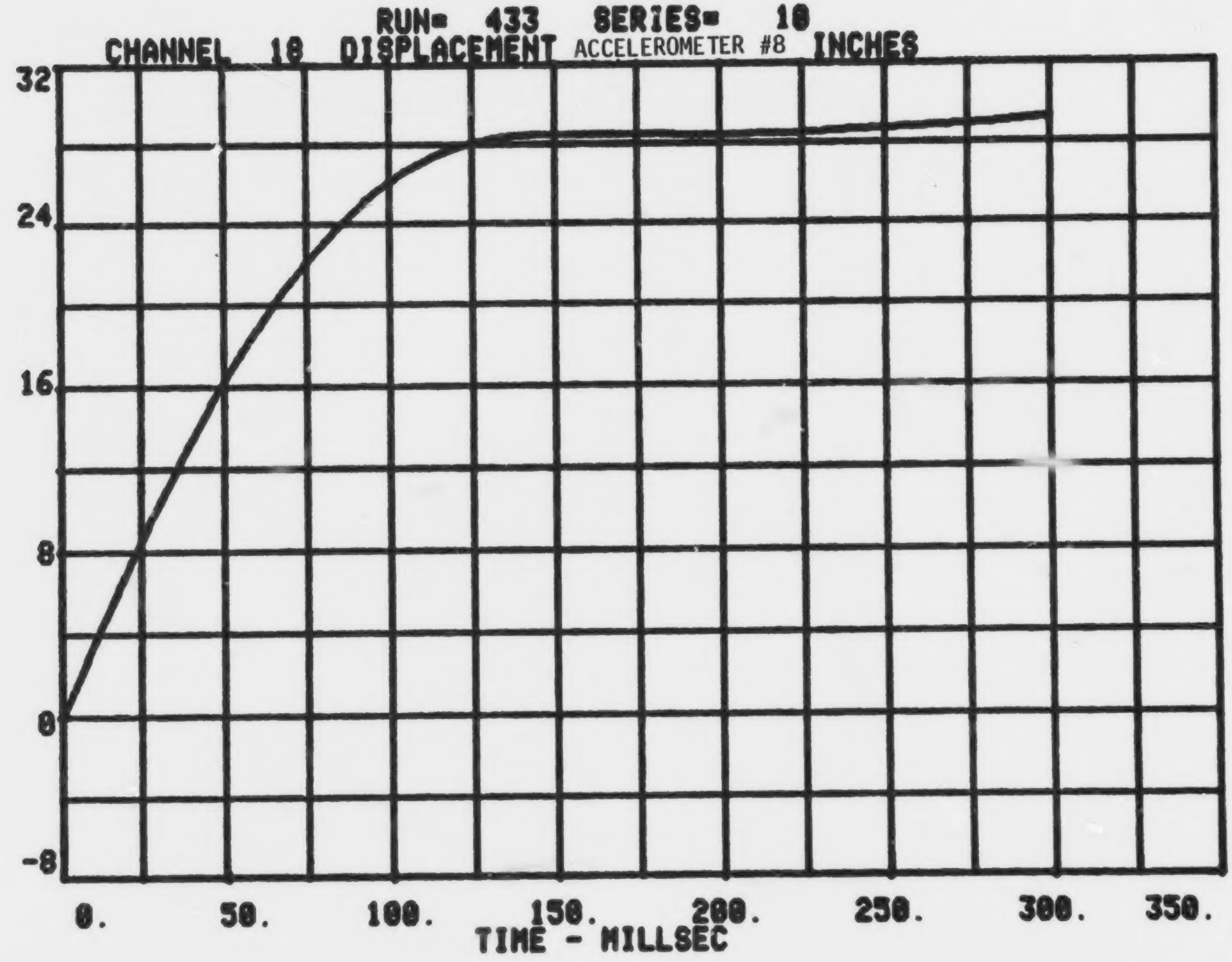
6440-V-6


RUN= 433 SERIES= 10
CHANNEL 17 VELOCITY ACCELEROMETER #8 MPH
32
24
16
8
0
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

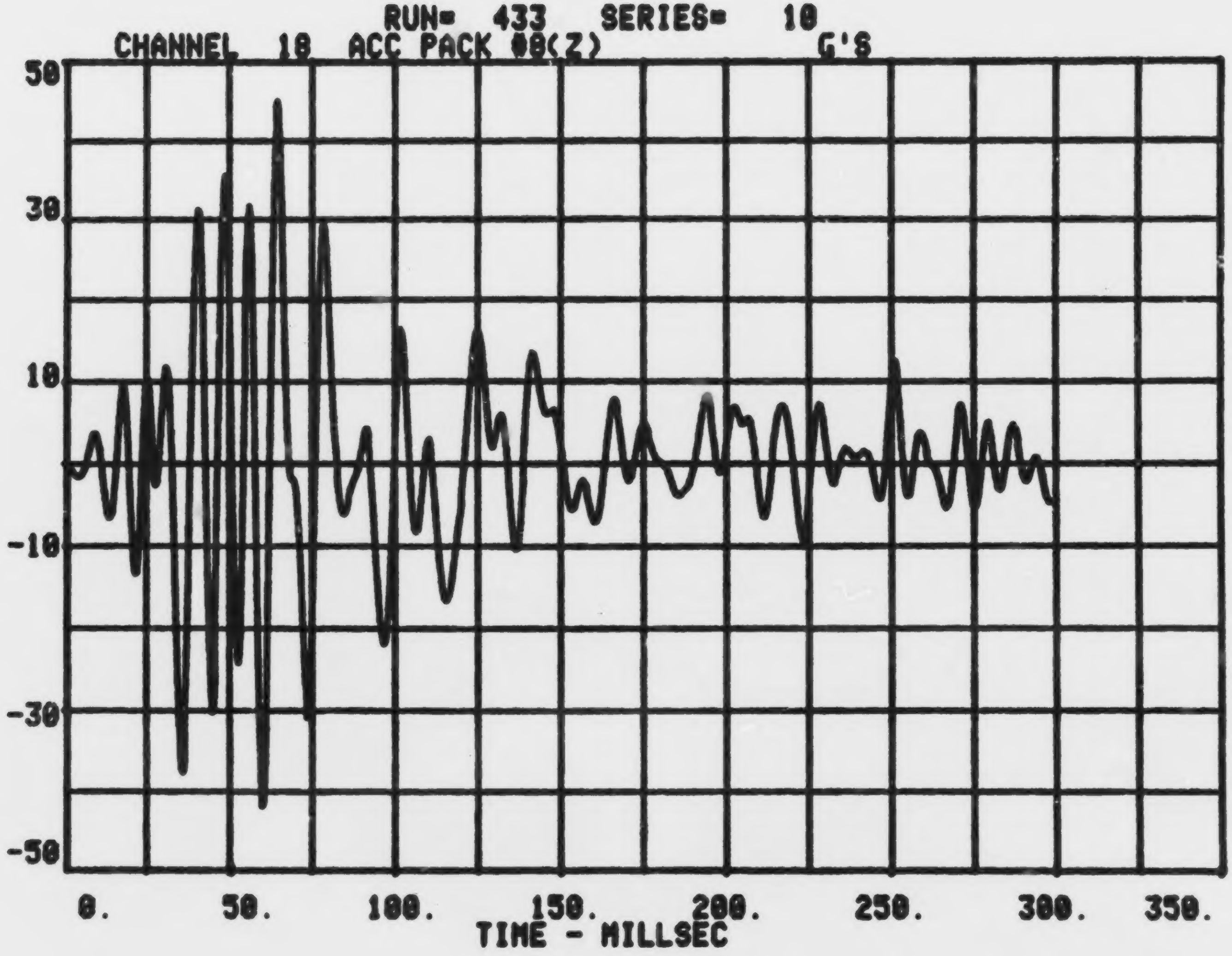
6440-V-6

769

770


RUN= 433 SERIES= 10
CHANNEL 18 DISPLACEMENT ACCELEROMETER #8 INCHES
32
24
16
8
0
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6


RUN= 433 SERIES= 10
CHANNEL 18 ACC PACK #8(Z)
G'S
50
30
10
-10
-30
-50
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

771

BLANK PAGE

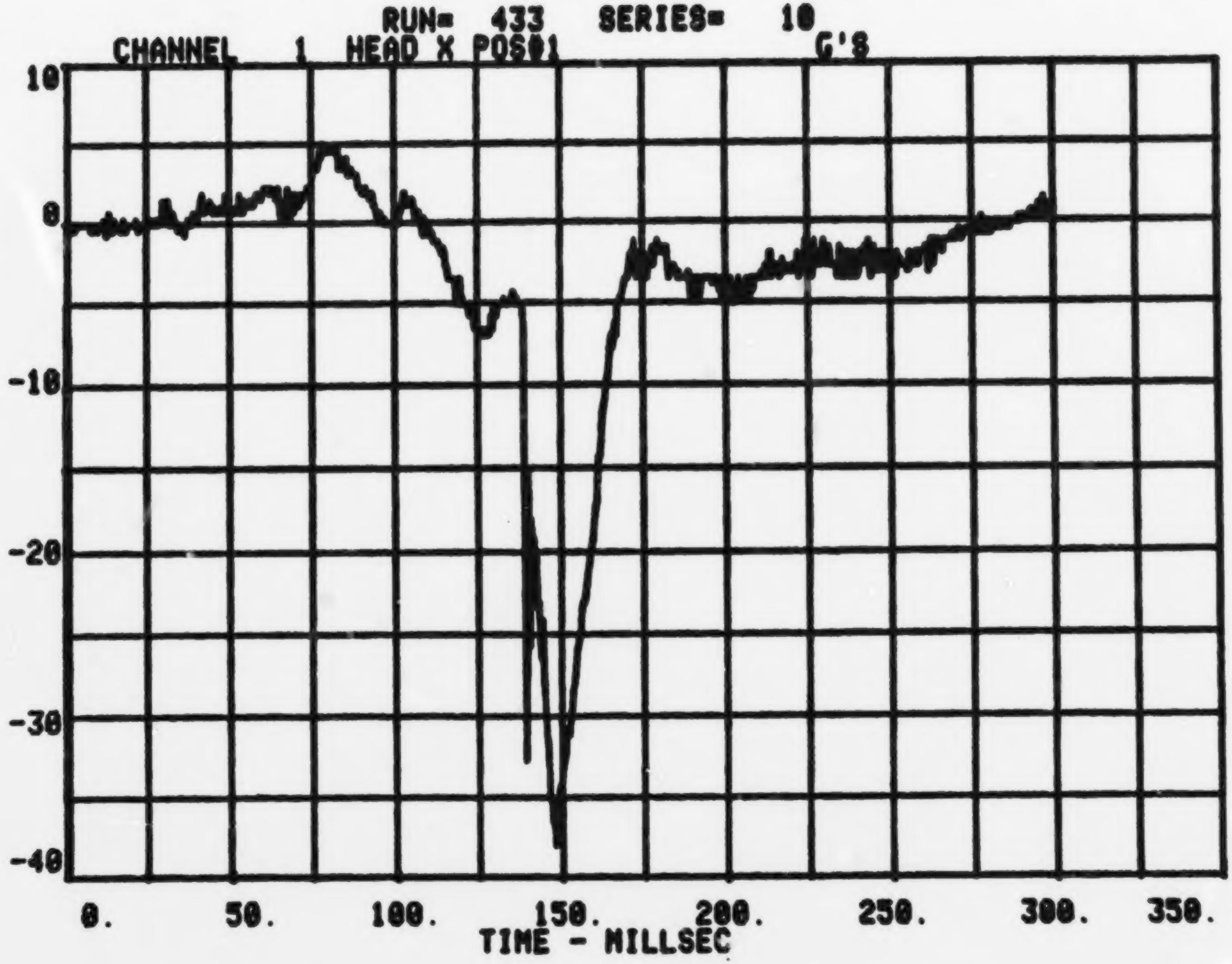
TEST NO. 9

DUMMY DATA

TRANSDUCER	FILTER CHANNEL CLASS
HEAD ACCELERATION	1000
CHEST ACCELERATION	180
BELT LOADS	60
FEMUR LOADS	600

```
                    HEAD INJURY CRITERION
                     HEAD SEVERITY INDEX

               BUS TEST

               RUN= 433

               HEAD RESULTANT (1)

      HIC= 238.8   FROM T1= .11910   TO T2= .16230

      AVERAGE ACCELERATION BETWEEN T1 AND T2=  31.4G'S

      EVENT TIME= 300.0  MSEC

      SEVERITY INDEX= 314.1
```

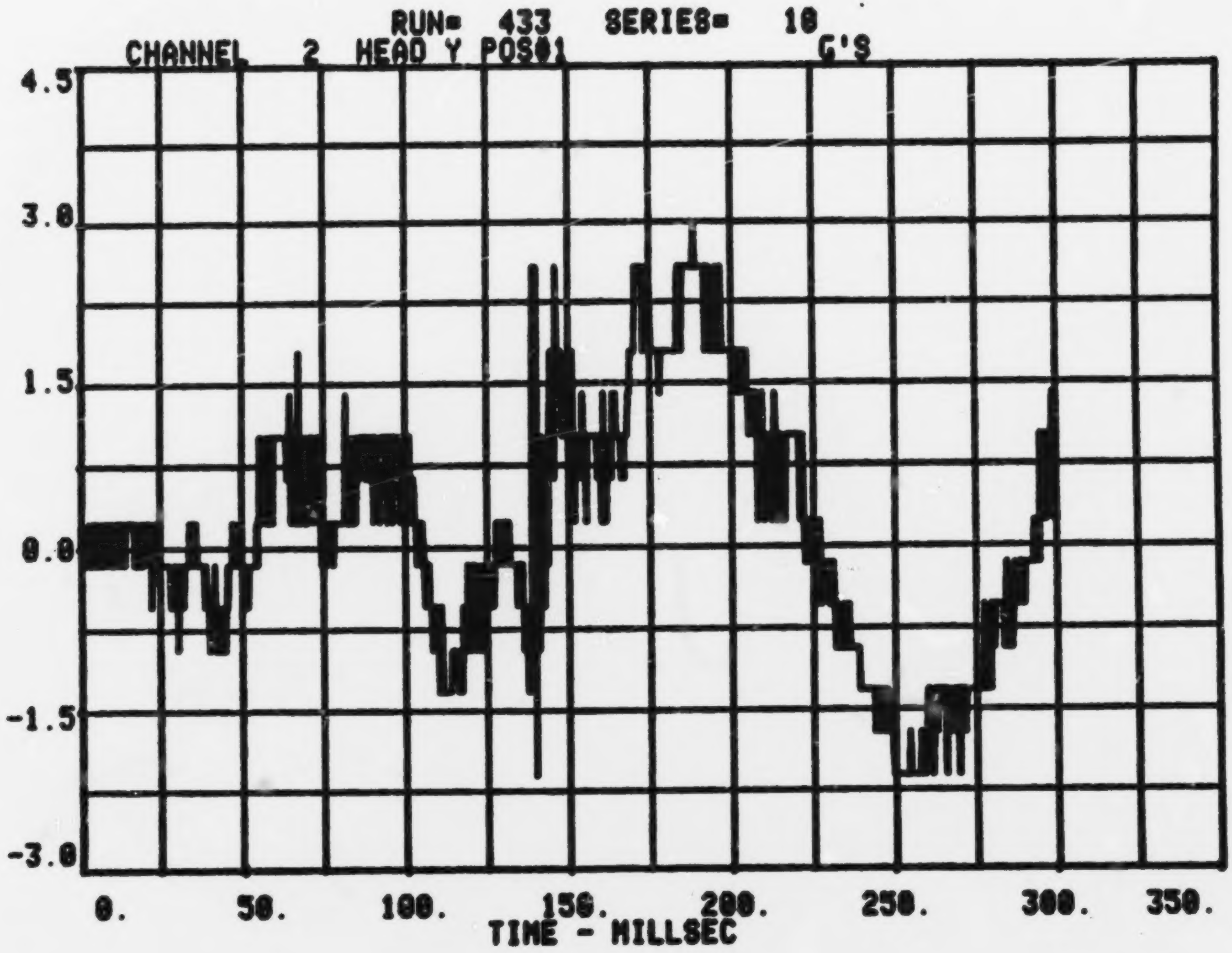
6440-V-5


RUN= 433 SERIES= 10
CHANNEL 1 HEAD X POS01 G'S
10
0
-10
-20
-30
-40
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

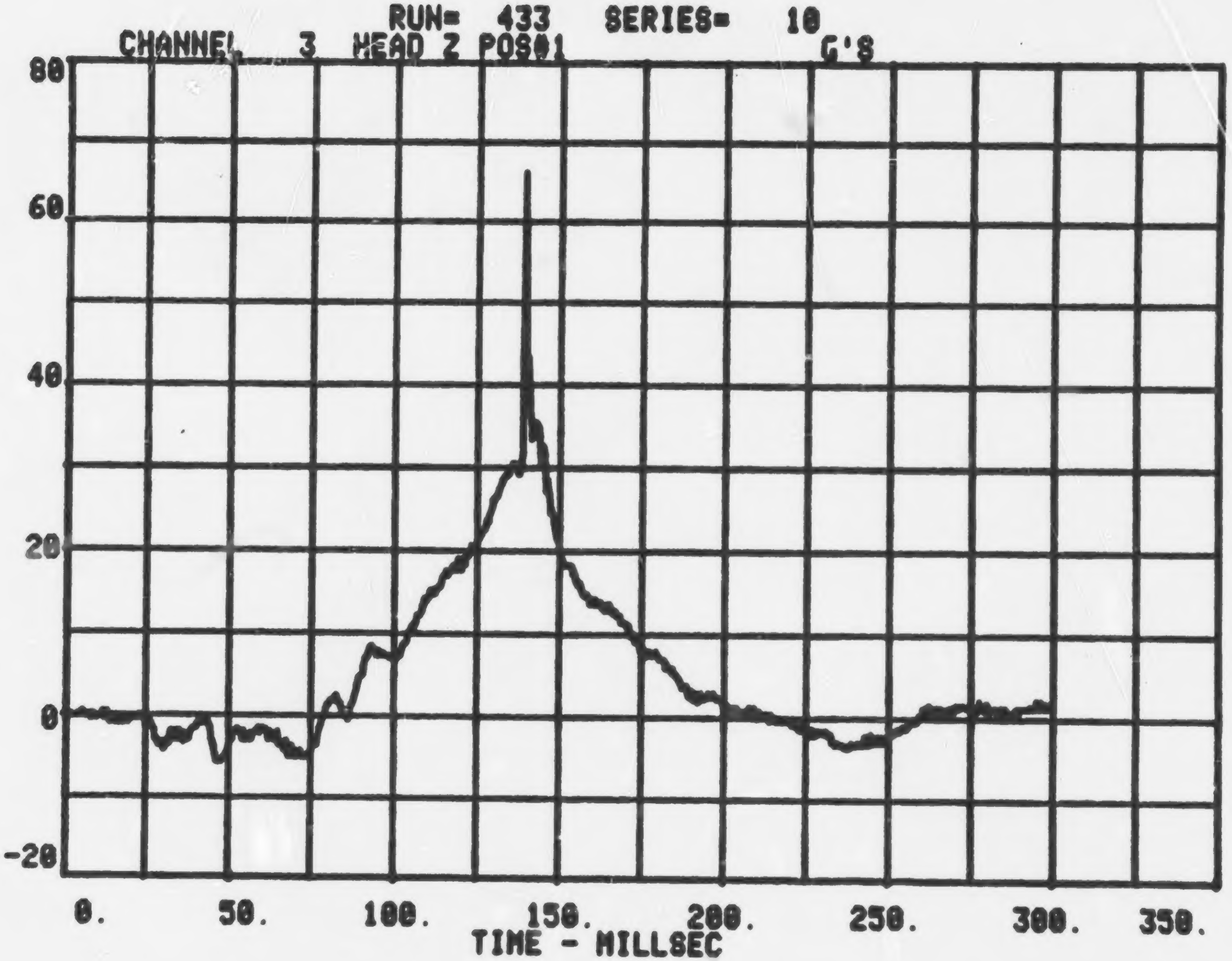
775

6440-V-6

776


RUN= 433 SERIES= 18
CHANNEL 2 HEAD Y POS01 G'S
4.5
3.0
1.5
0.0
-1.5
-3.0
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

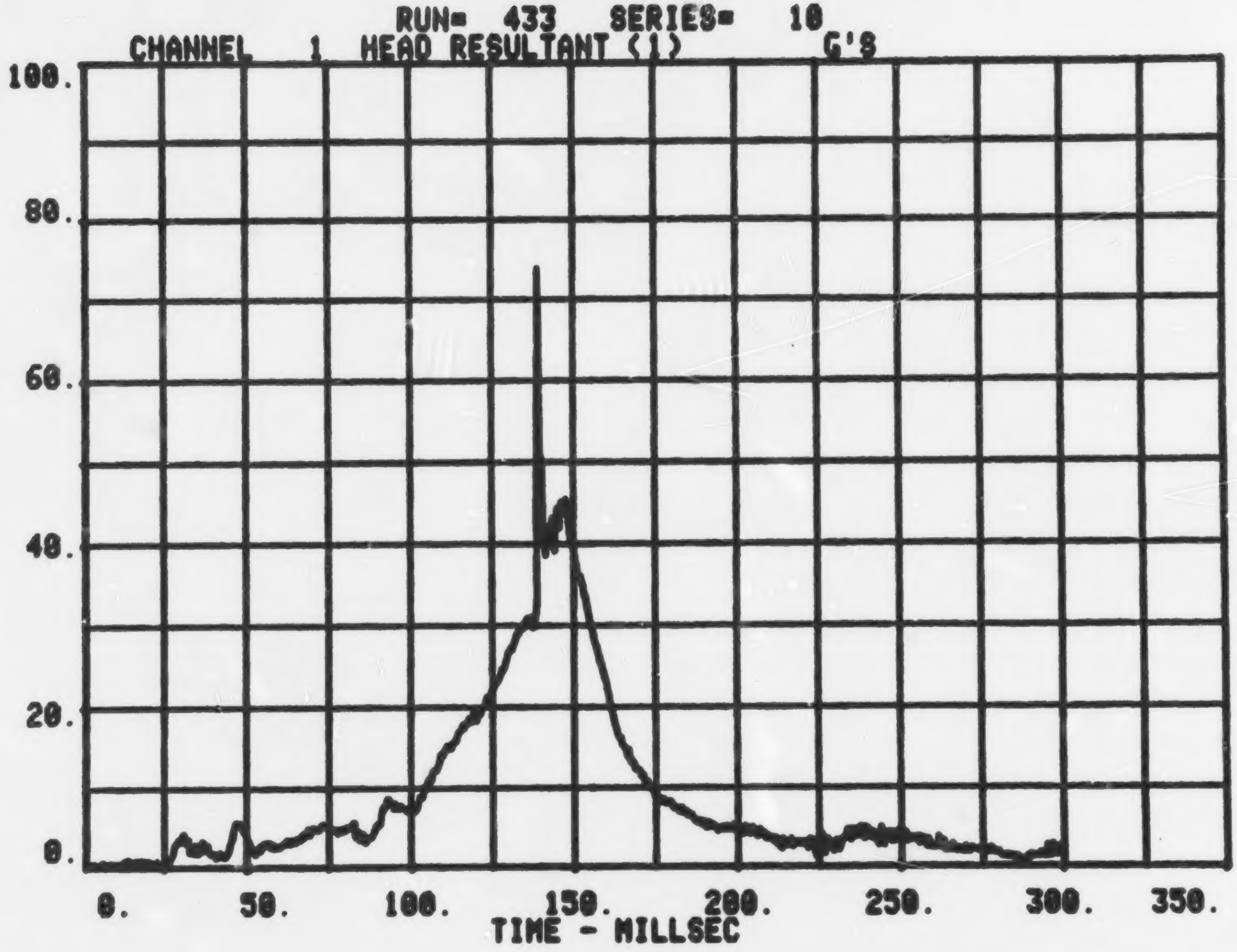
6440-V-6


RUN= 433 SERIES= 10
CHANNEL 3 HEAD 2 POS#1
G'S
80
60
40
20
0
-20
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

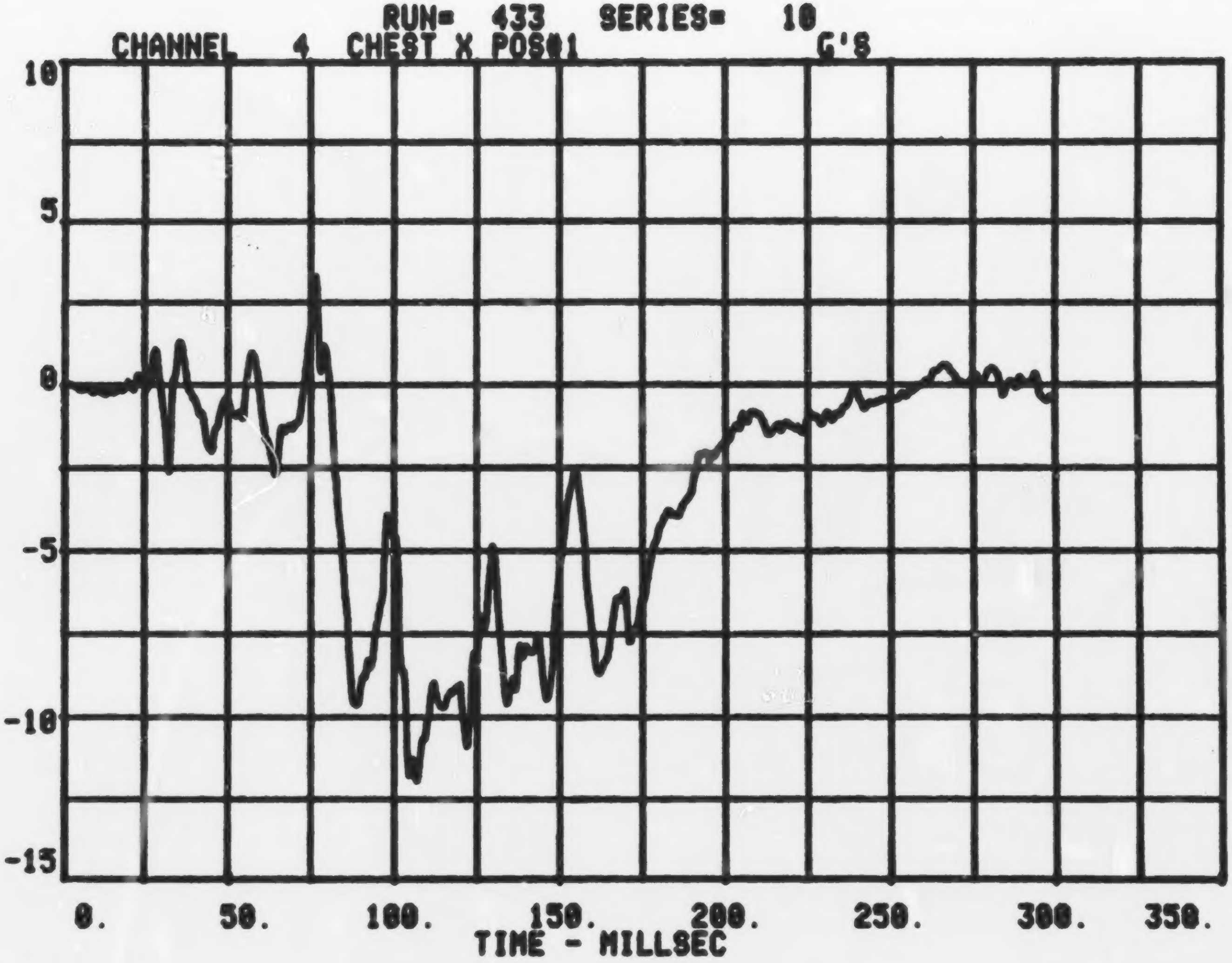
6440-V-6

777

778

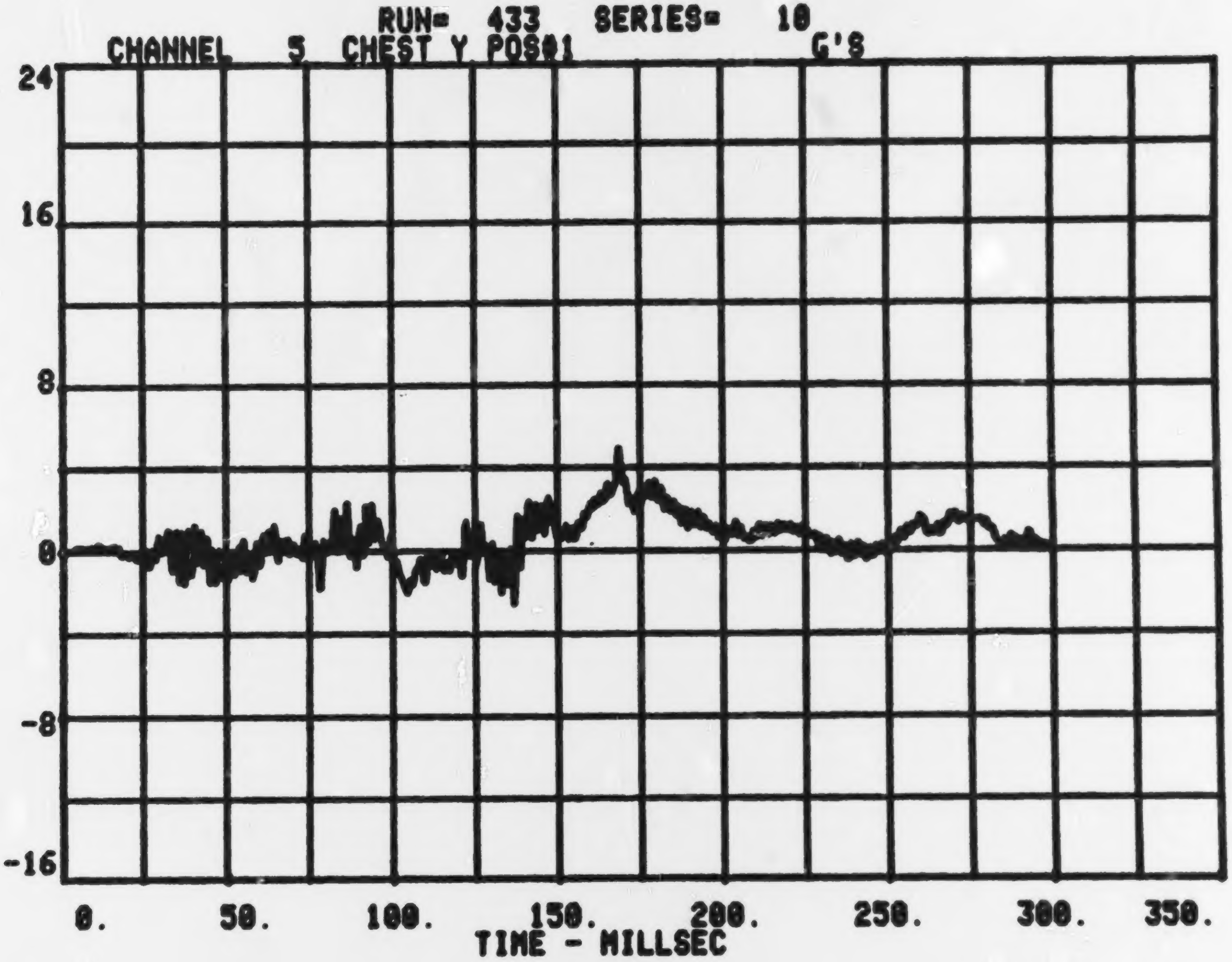

RUN= 433 SERIES= 10
CHANNEL 1 HEAD RESULTANT (1) G'S
100.
80.
60.
40.
20.
0.
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

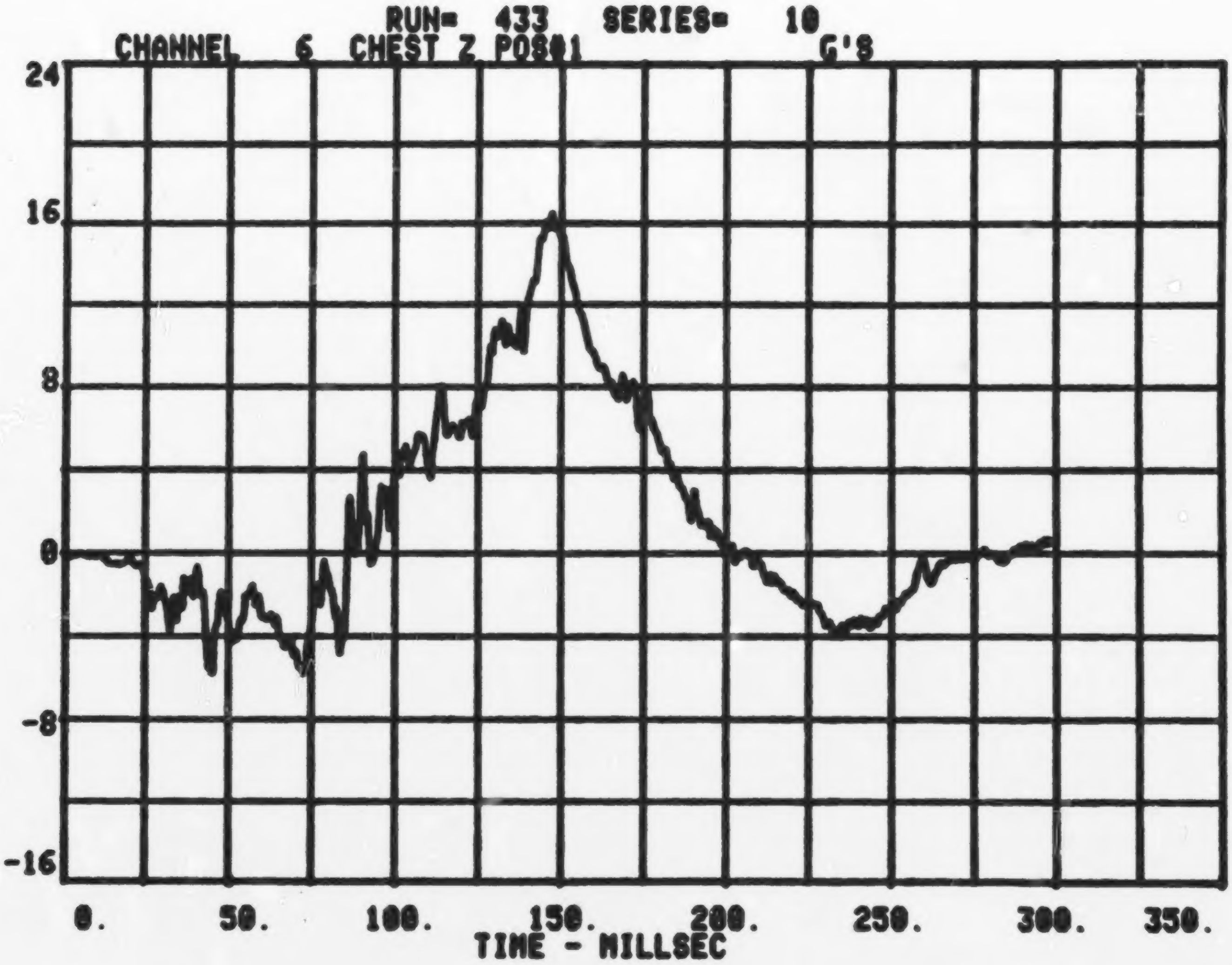

RUN= 433 SERIES= 10
CHANNEL 4 CHEST X POS#1 G'S
10
5
0
-5
-10
-15
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

7.80


RUN= 433 SERIES= 10
CHANNEL 5 CHEST Y POS#1
G'S
24
16
8
0
-8
-16
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

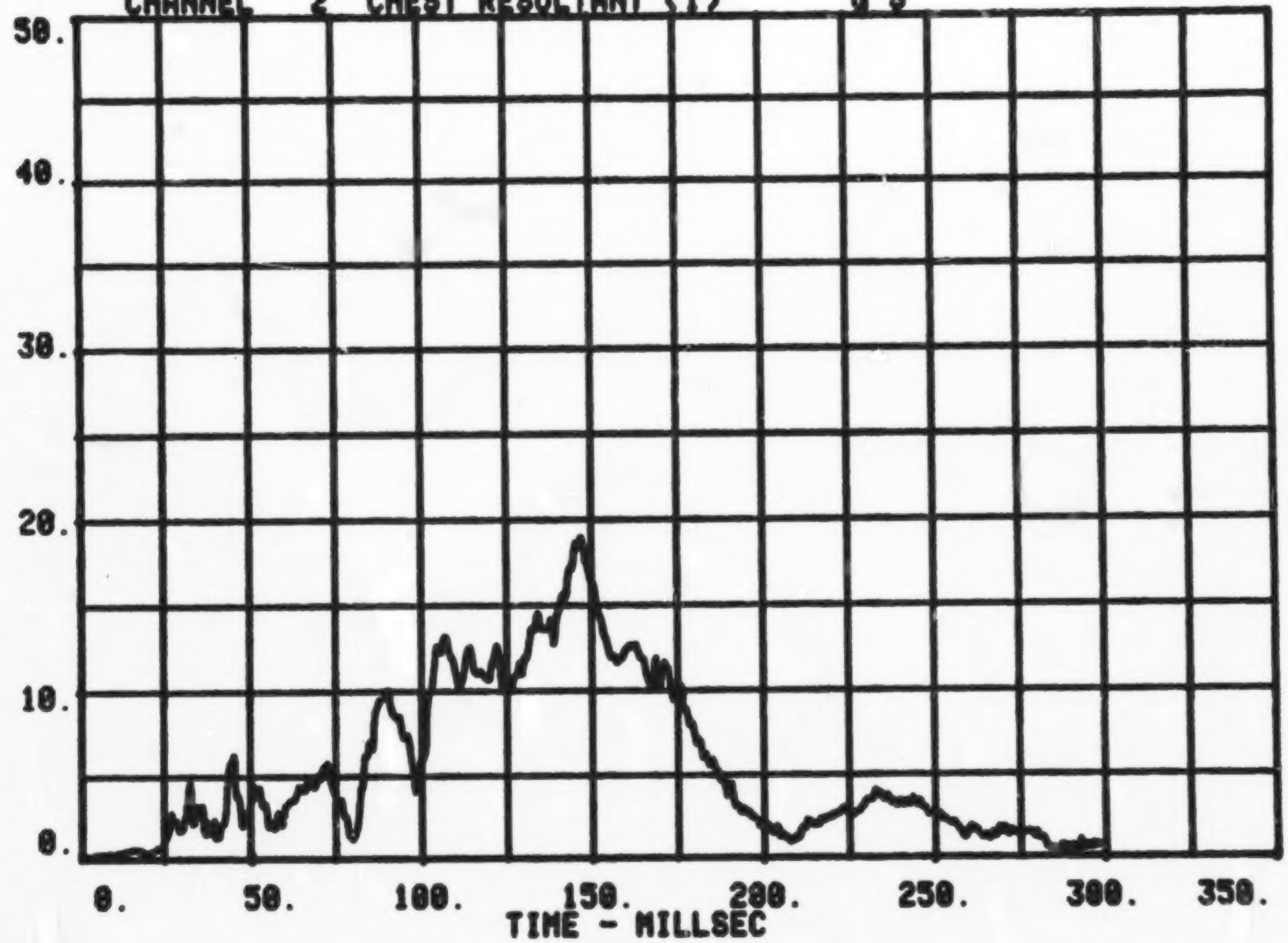

RUN= 433 SERIES= 10
CHANNEL 6 CHEST Z POS#1
G'S
24
16
8
0
-8
-16
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

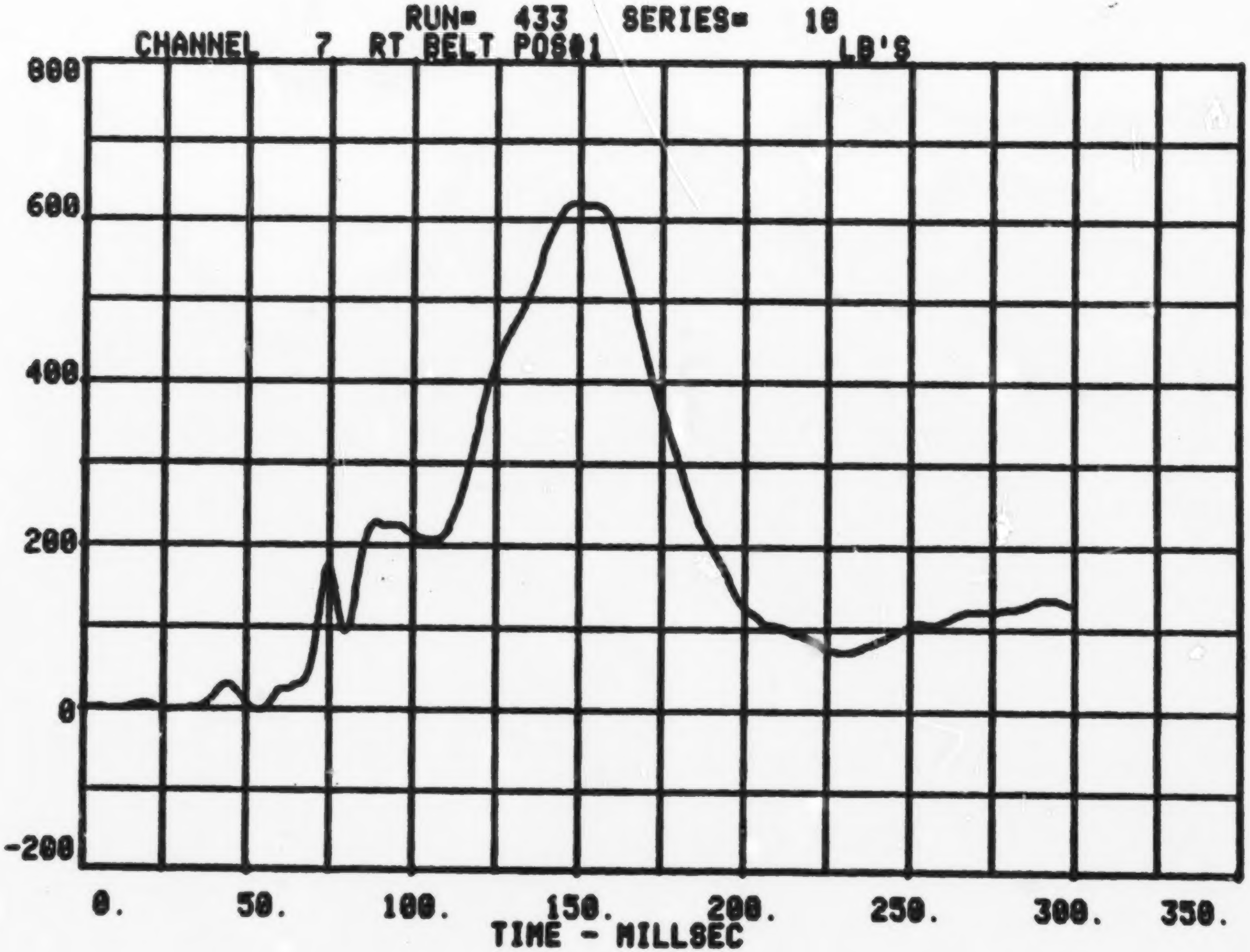
782

RUN= 433 SERIES= 10

CHANNEL 2 CHEST RESULTANT (1) G'S

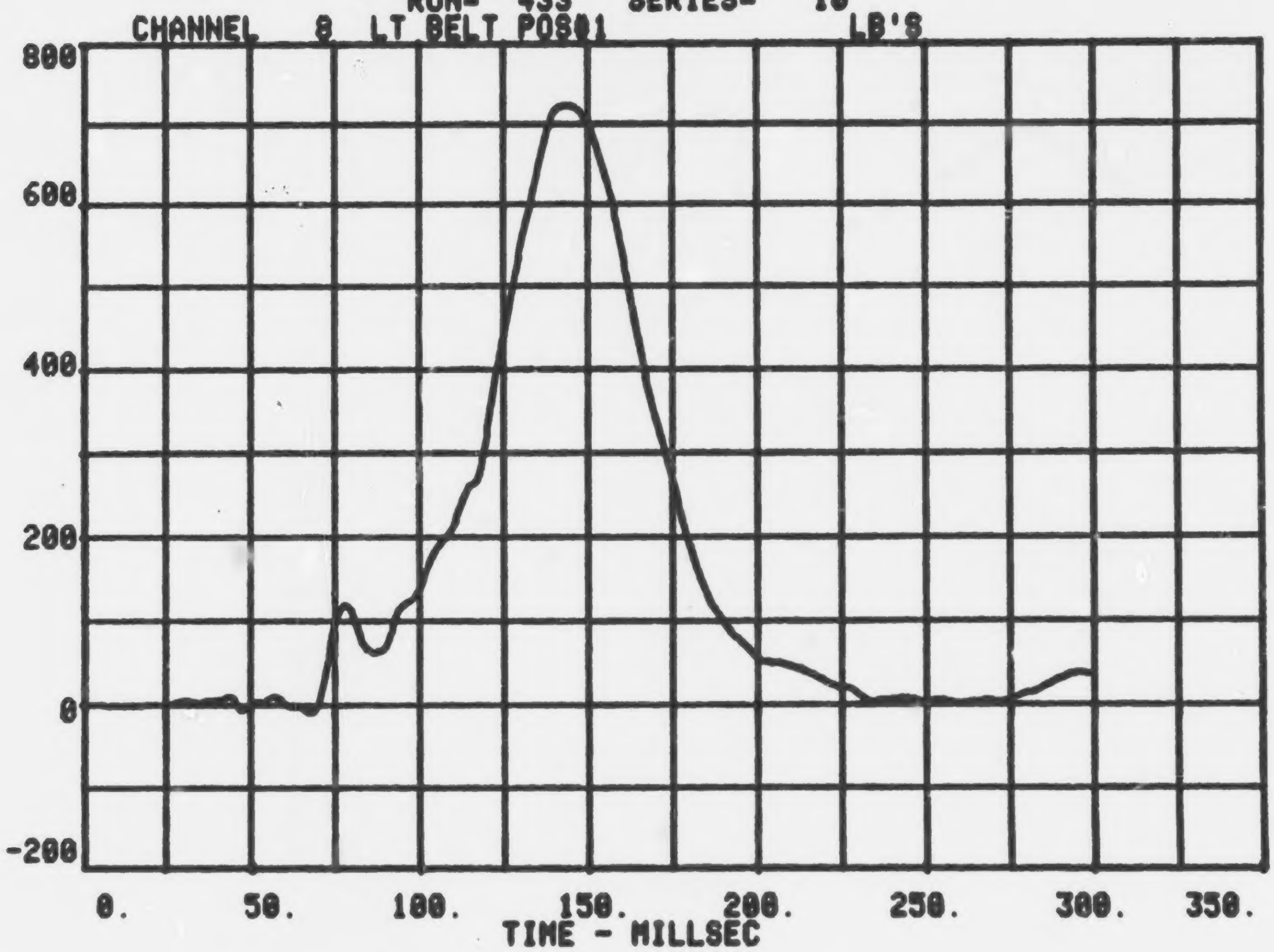


6440-V-6


RUN= 433 SERIES= 10
CHANNEL 7 RT BELT POS01 LB'S
800
600
400
200
0
-200
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

784



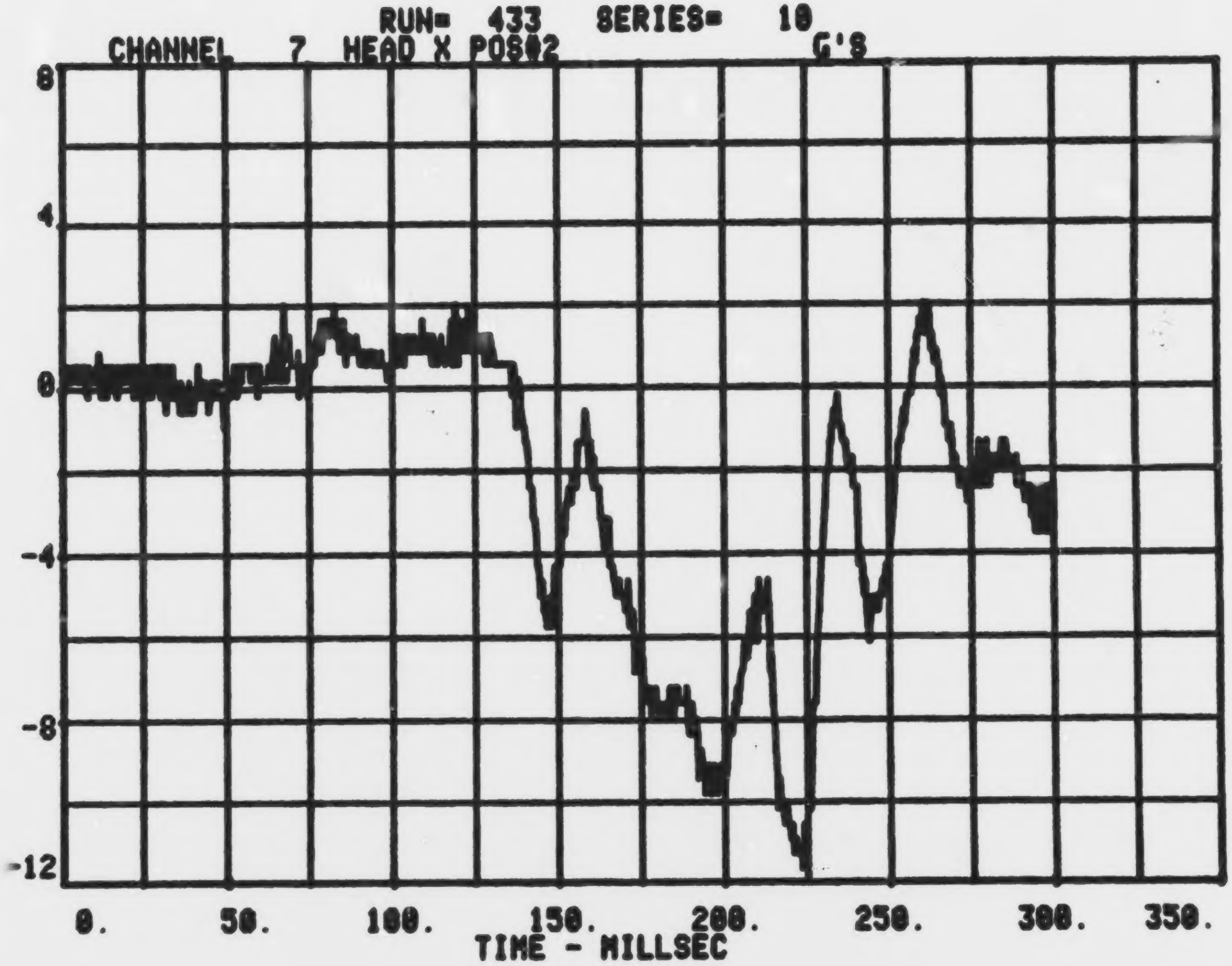
RUN= 433 SERIES= 10
CHANNEL 8 LT BELT POS01
LB'S
800
600
400
200
0
-200
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

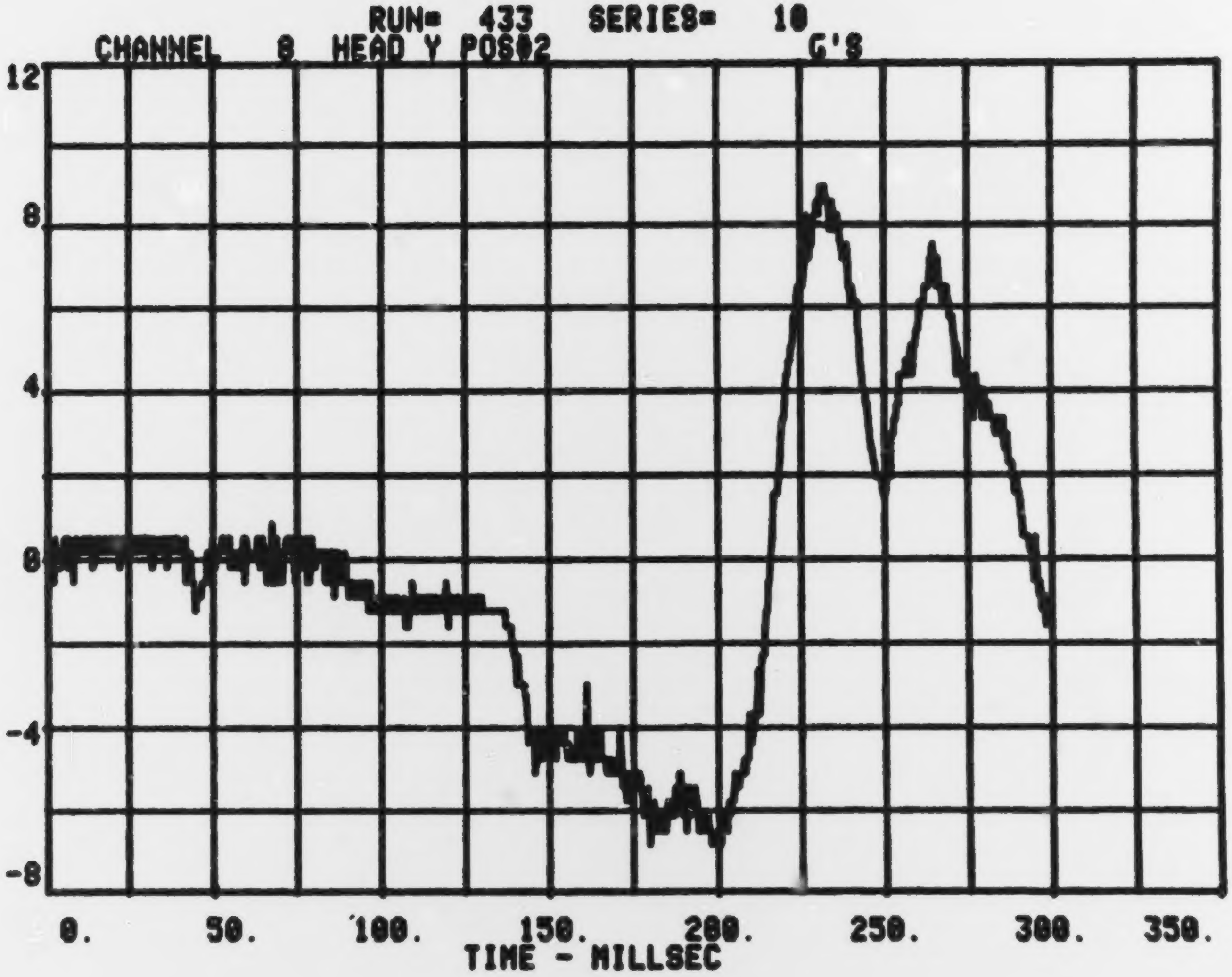
```
                    HEAD INJURY CRITERION
                    HEAD SEVERITY INDEX

             BUS TEST

             RUN= 433

             HEAD RESULTANT (2)

      HIC=  70.0   FROM T1= .15240   TO T2= .24570

      AVERAGE ACCELERATION BETWEEN T1 AND T2=  14.1G'S

      EVENT TIME= 300.0  MSEC

      SEVERITY INDEX=  84.7
```

6440-V-6

786

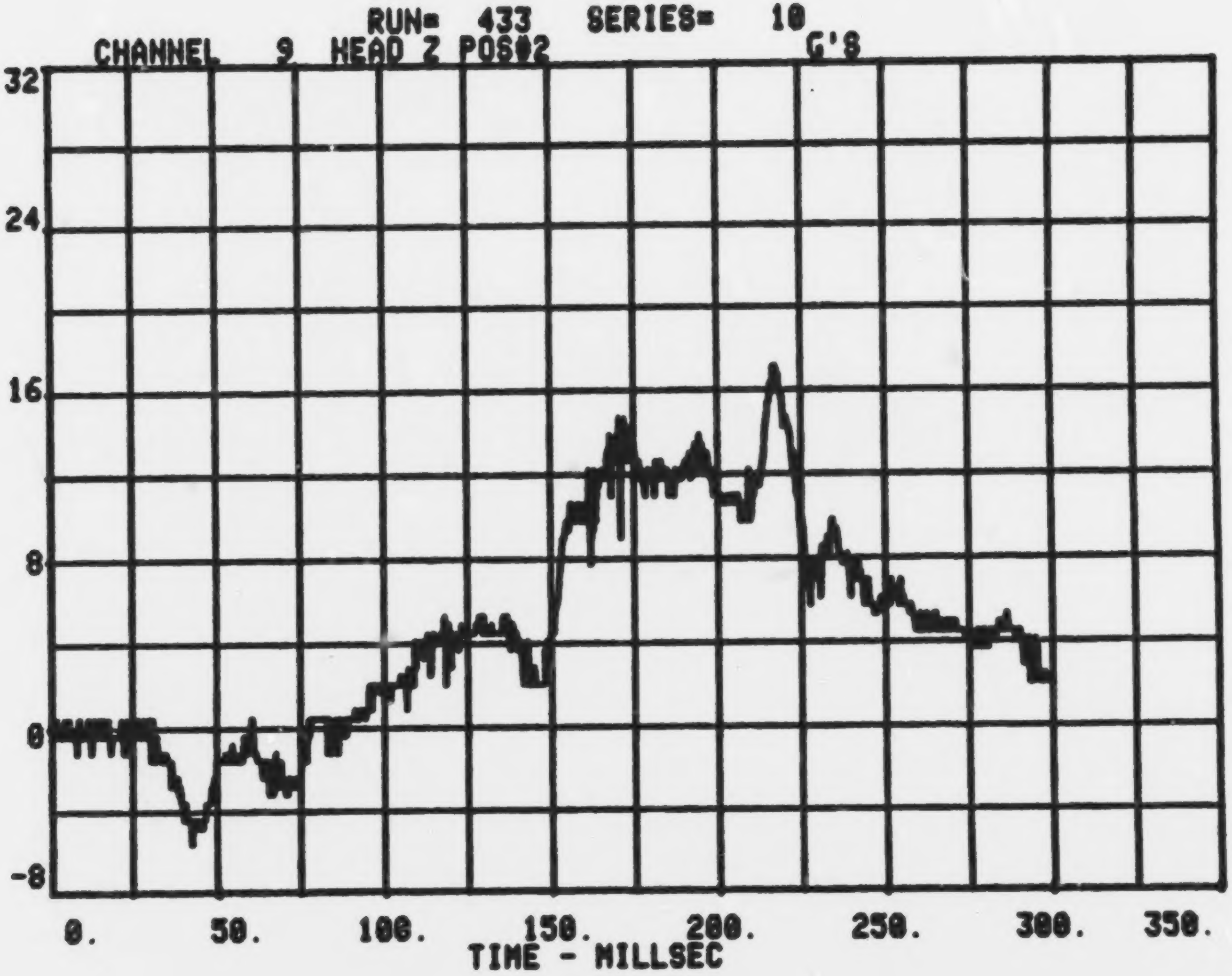

RUN= 433 SERIES= 10
CHANNEL 7 HEAD X POS#2 G'S
8
4
0
-4
-8
-12
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

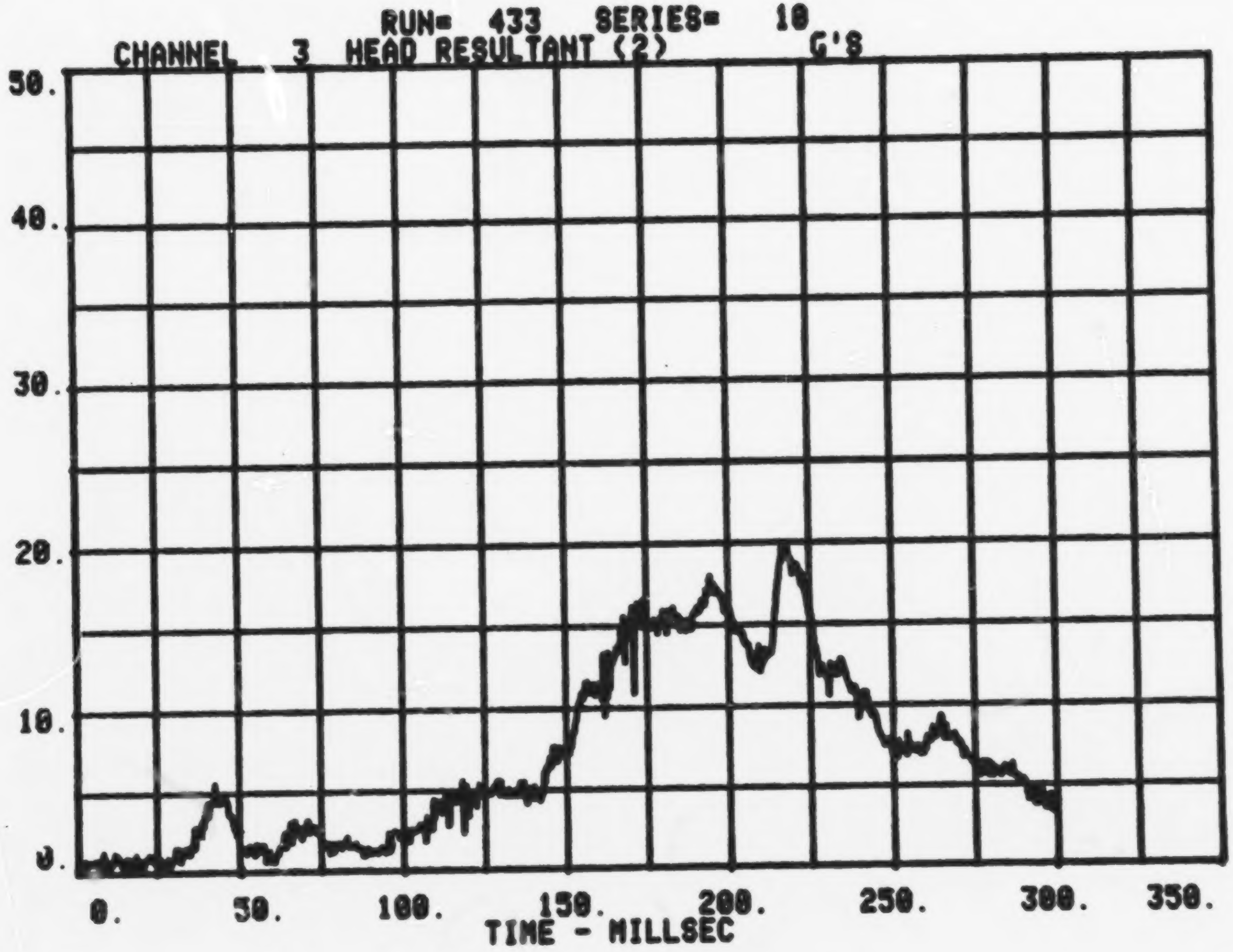

RUN= 433 SERIES= 10
CHANNEL 8 HEAD Y POS02
G'S
12
8
4
0
-4
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

787


RUN= 433 SERIES= 10
CHANNEL 9 HEAD Z POS#2
G'S
32
24
16
8
0
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

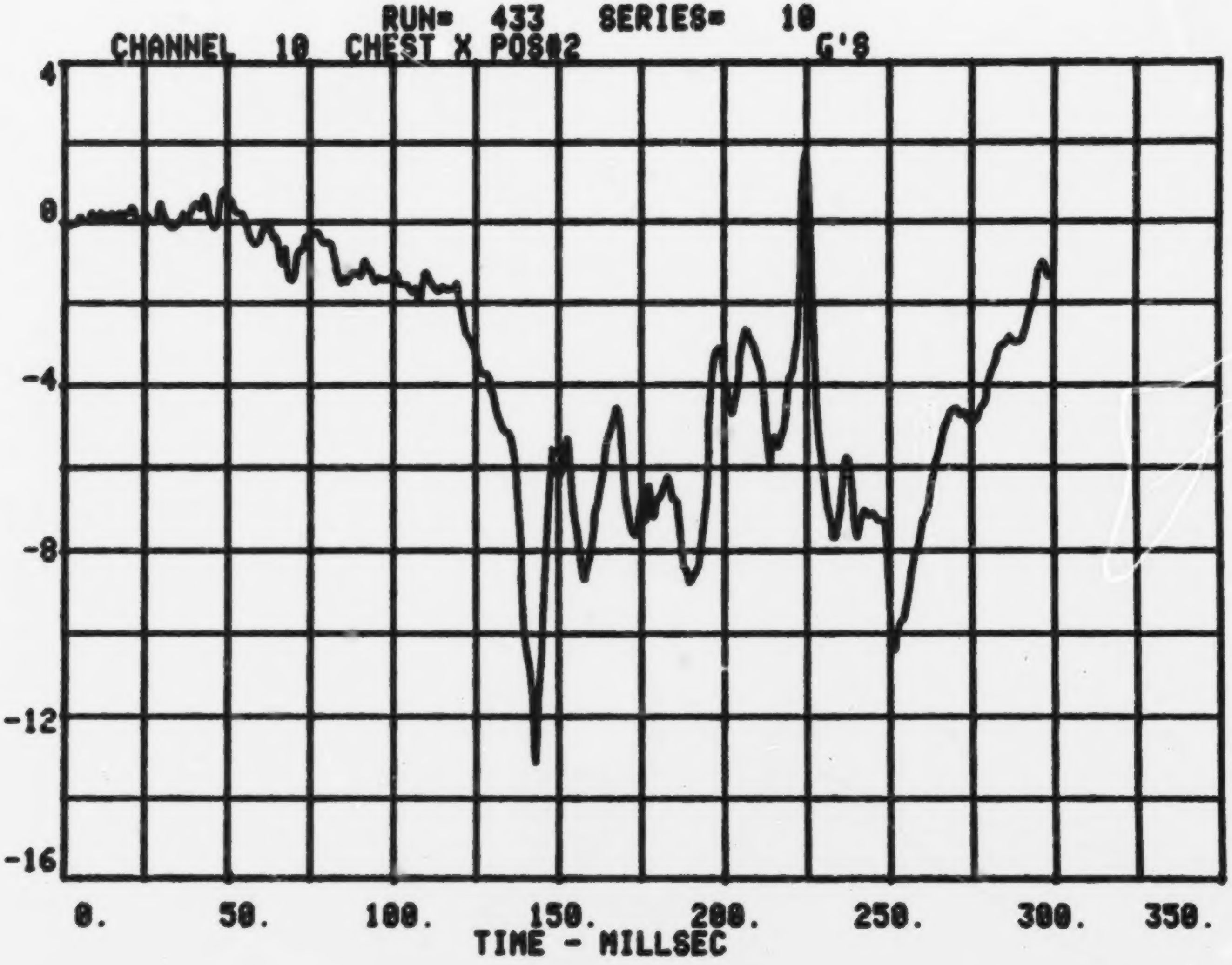
6440-V-6


RUN= 433 SERIES= 10
CHANNEL 3 HEAD RESULTANT (2) G'S
50.
40.
30.
20.
10.
0.
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

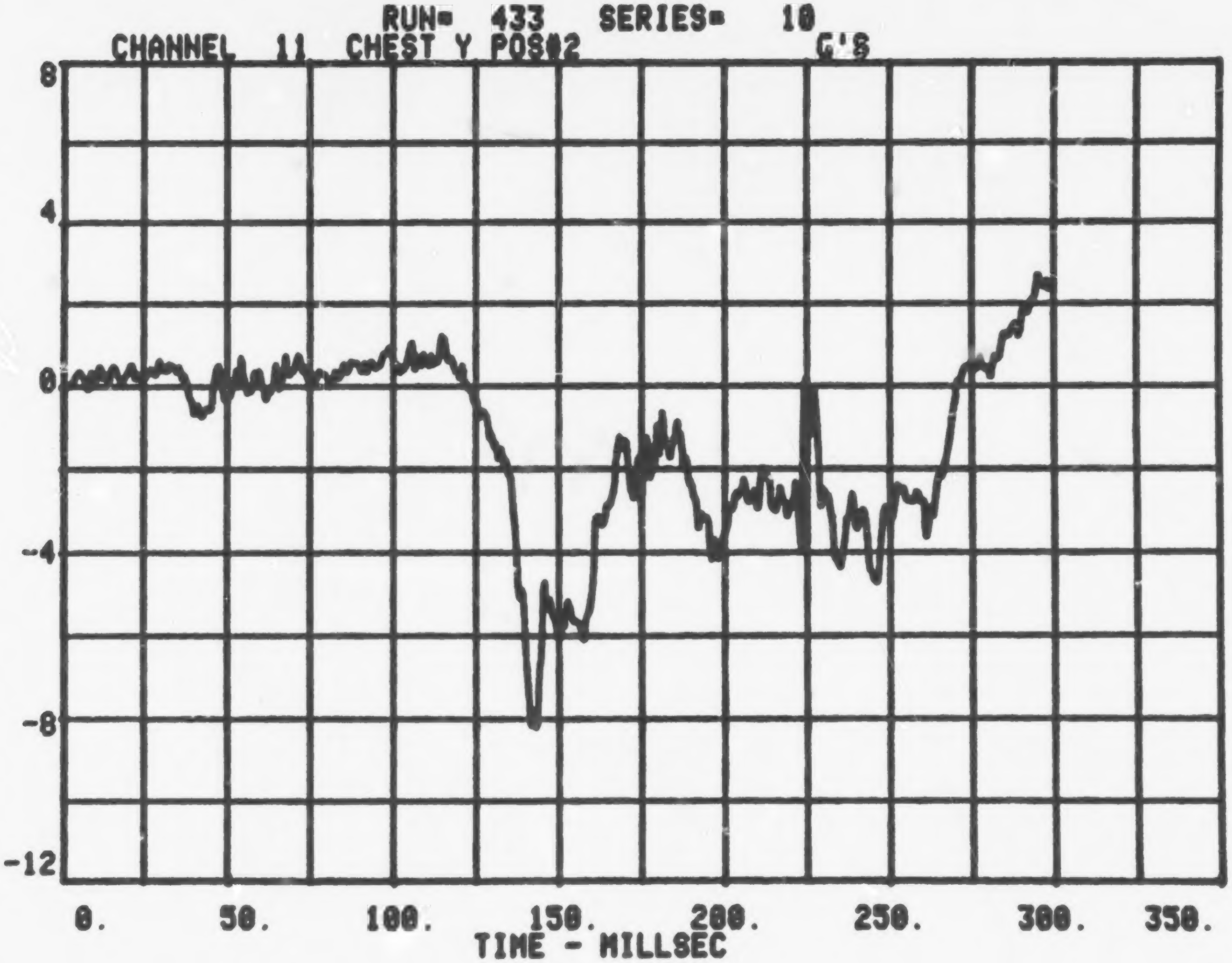
6440-V-6

789

790


RUN= 433 SERIES= 10
CHANNEL 10 CHEST X POS#2
G'S
4
0
-4
-8
-12
-16
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

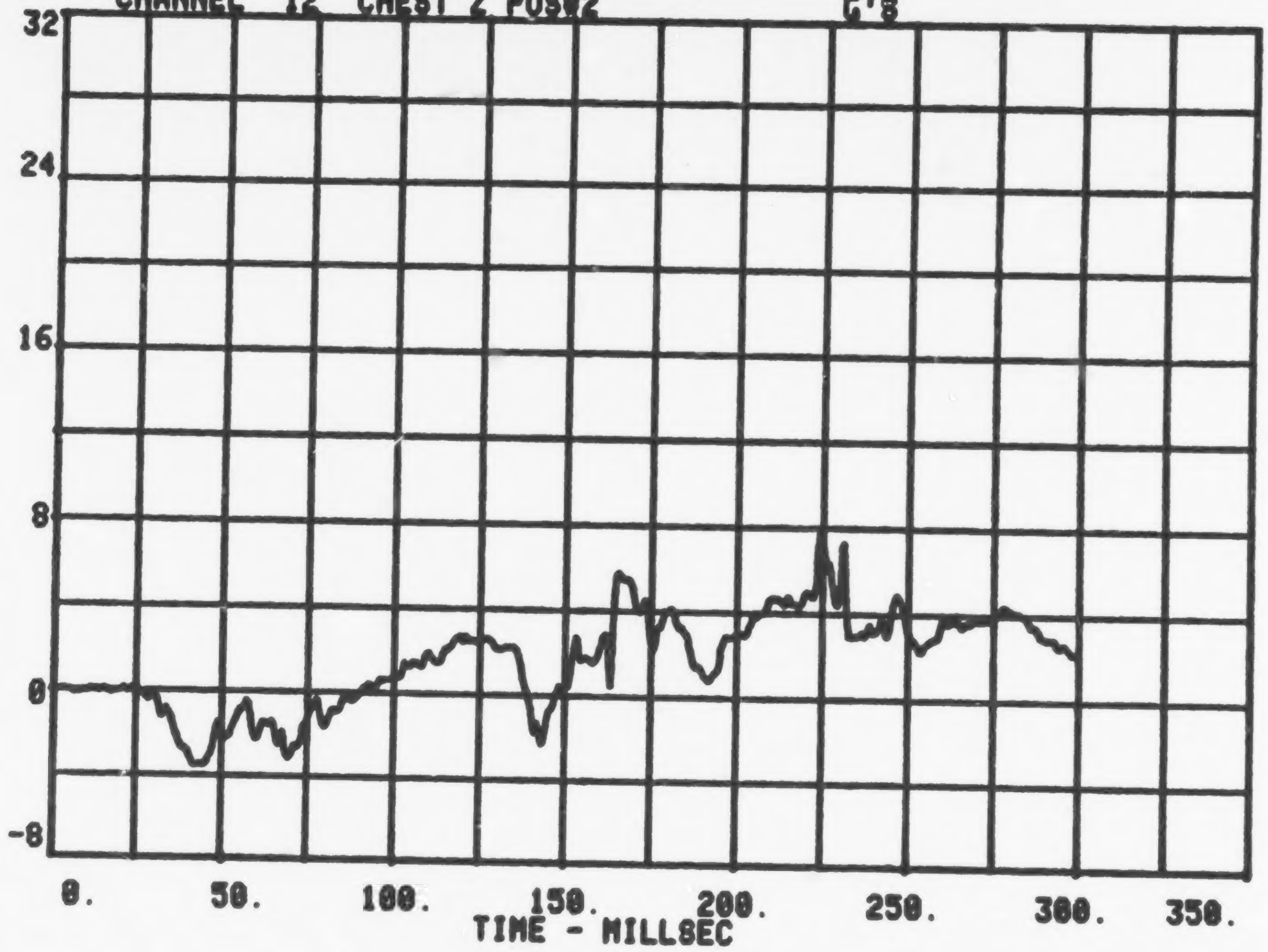

RUN= 433 SERIES= 10
CHANNEL 11 CHEST Y POS#2
G'S
8
4
0
-4
-8
-12
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

792

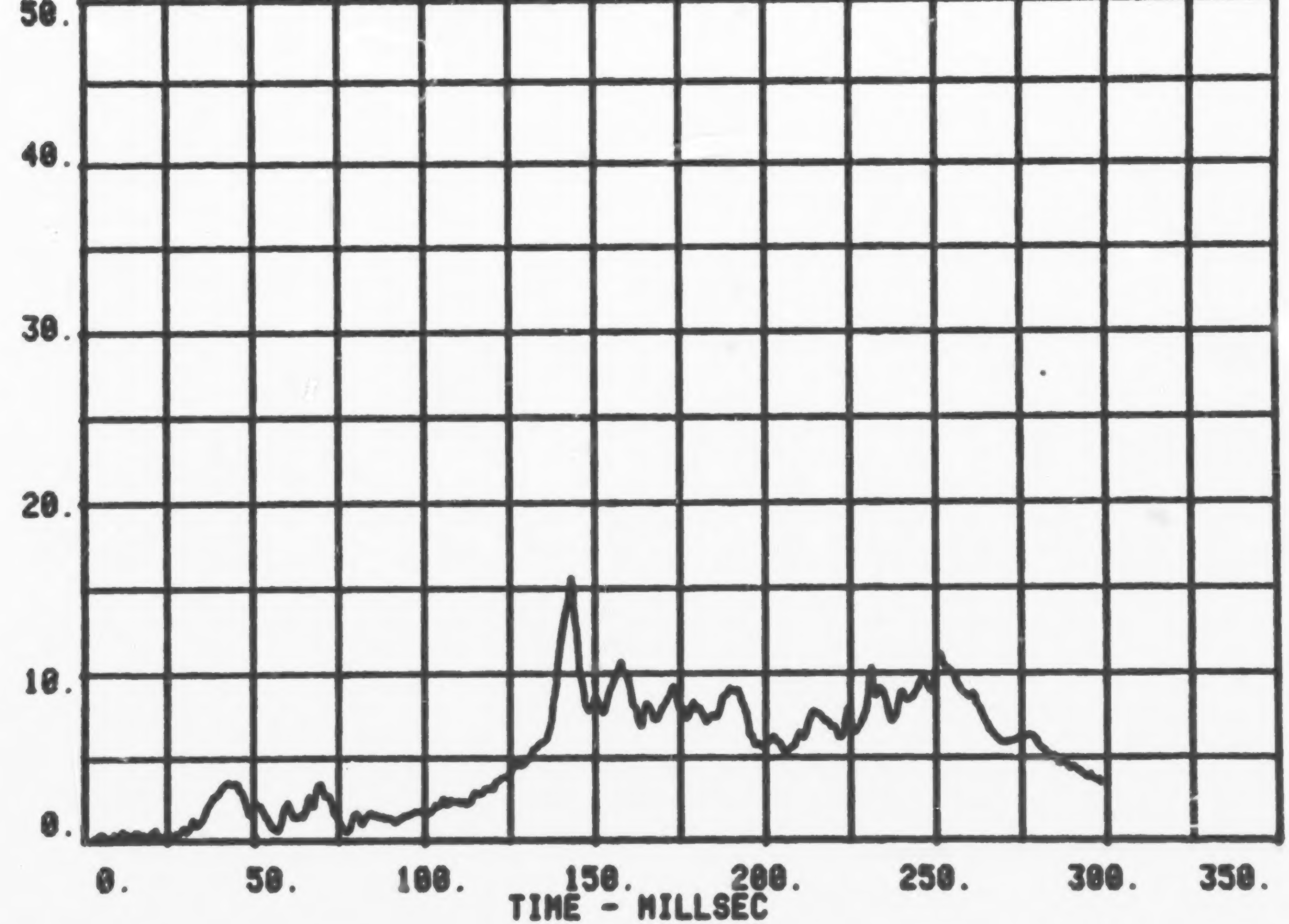
RUN= 433 SERIES= 10

CHANNEL 12 CHEST Z POS#2

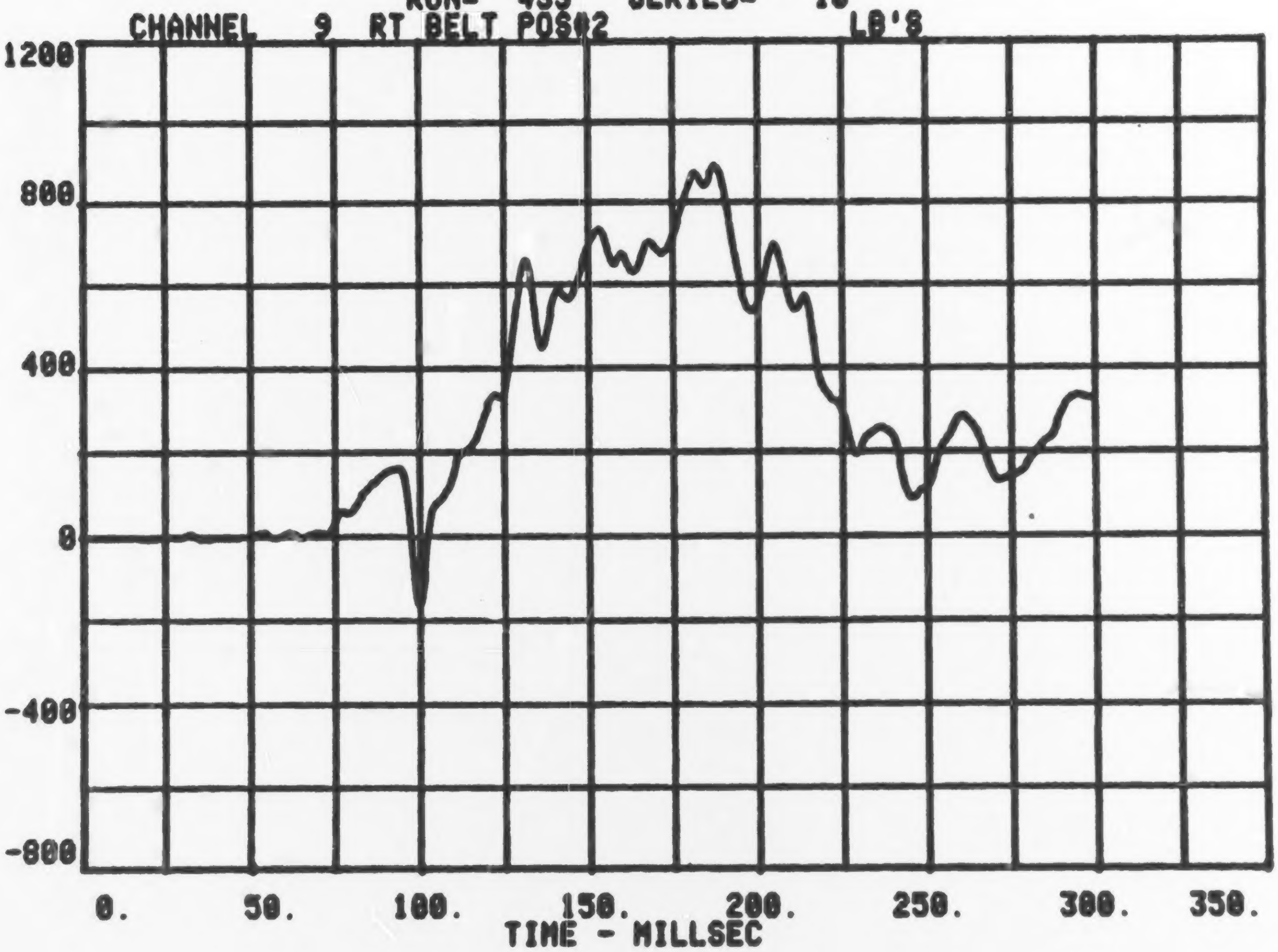


6440-V-6

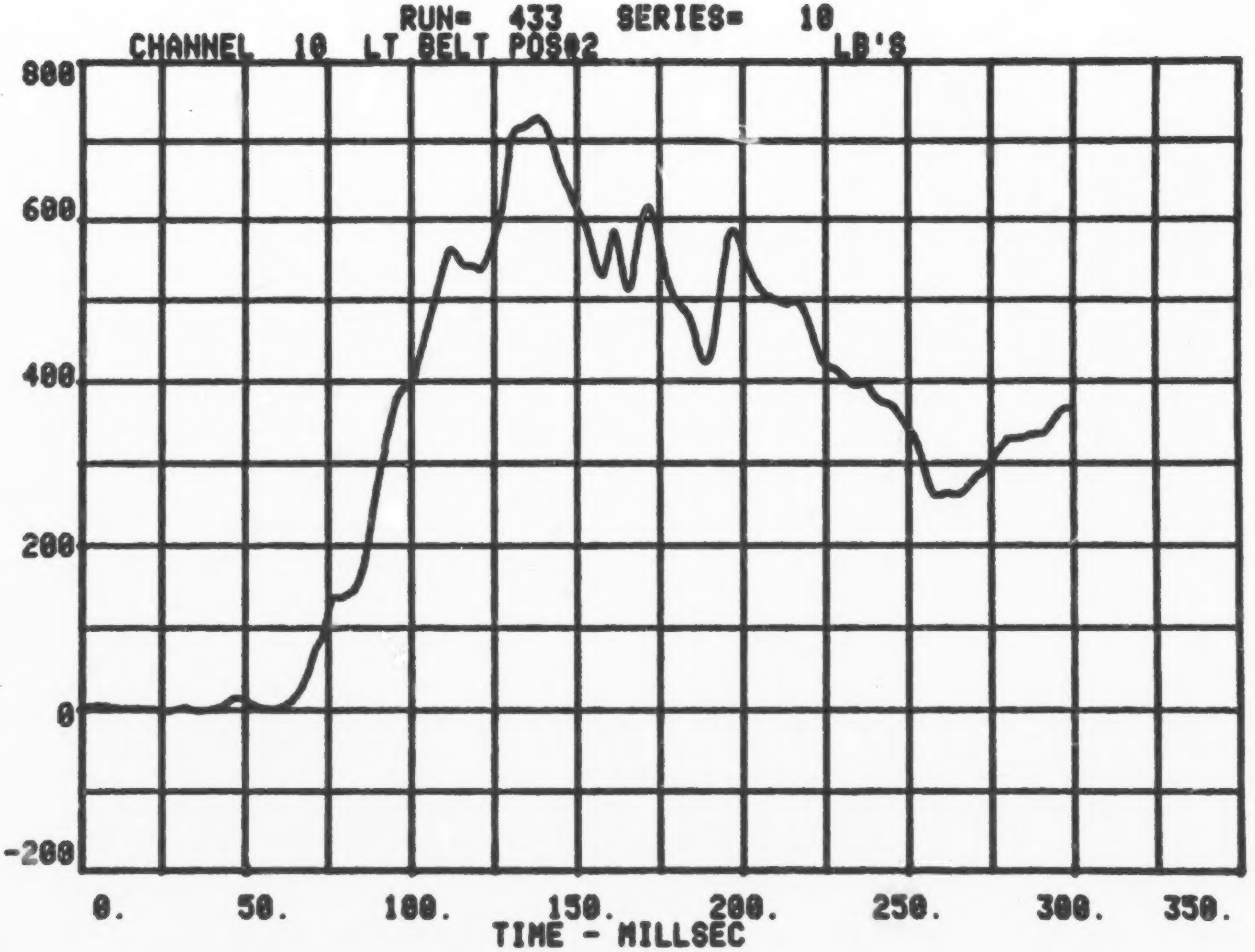
RUN= 433 SERIES= 10
CHANNEL 4 CHEST RESULTANT (2)



794


RUN= 433 SERIES= 10
CHANNEL 9 RT BELT POS#2
LB'S
1200
800
400
0
-400
-800
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

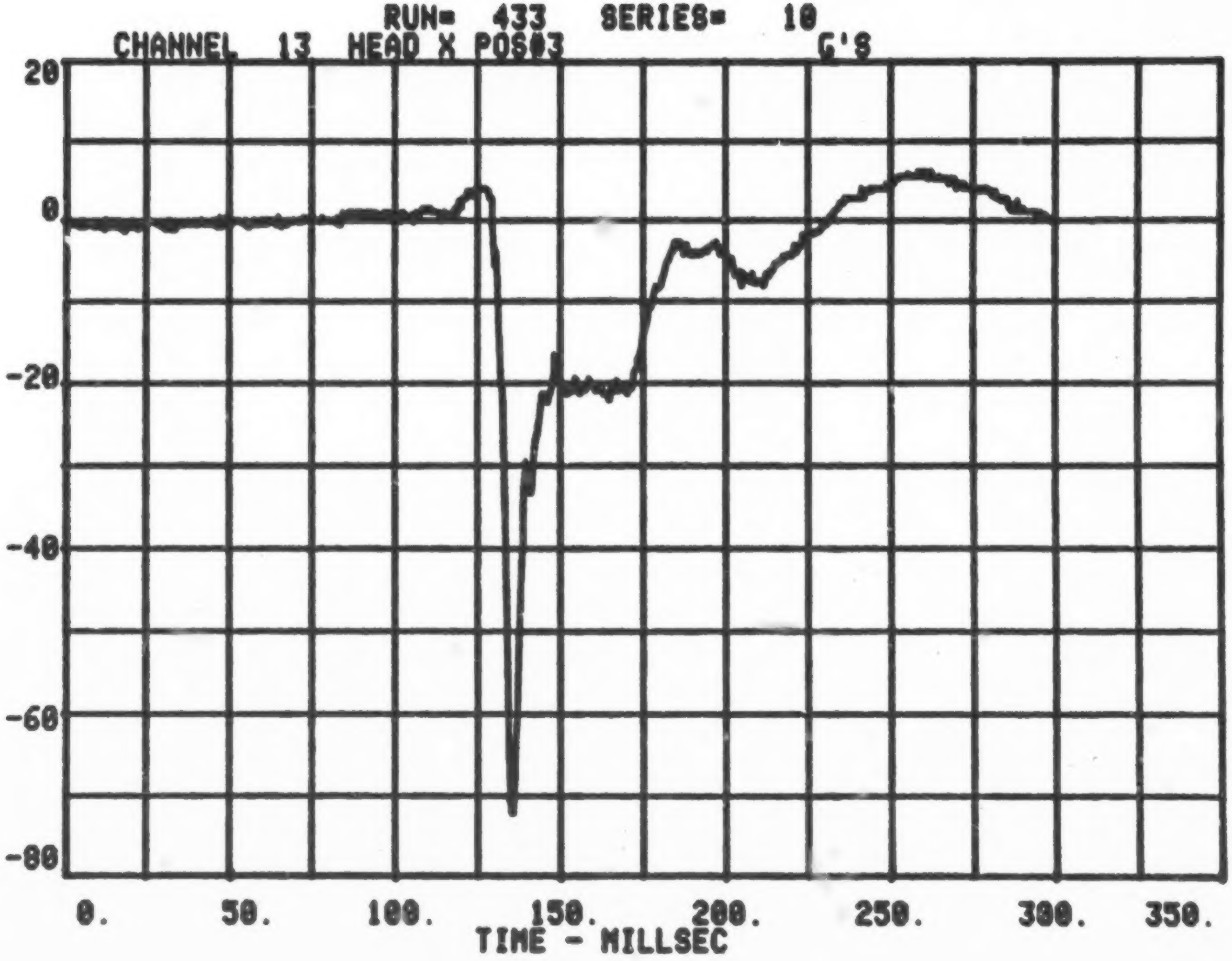
6440-V-6


RUN= 433 SERIES= 10
CHANNEL 10 LT BELT POS#2
LB'S
800
600
400
200
0
-200
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

795

```
                    HEAD INJURY CRITERION
                    HEAD SEVERITY INDEX

               BUS TEST

               RUN= 433

               HEAD RESULTANT (3)

       HIC= 246.0   FROM T1= .13230   TO T2= .17340

       AVERAGE ACCELERATION BETWEEN T1 AND T2=  32.4G'S

       EVENT TIME= 300.0  MSEC

       SEVERITY INDEX= 334.1
```

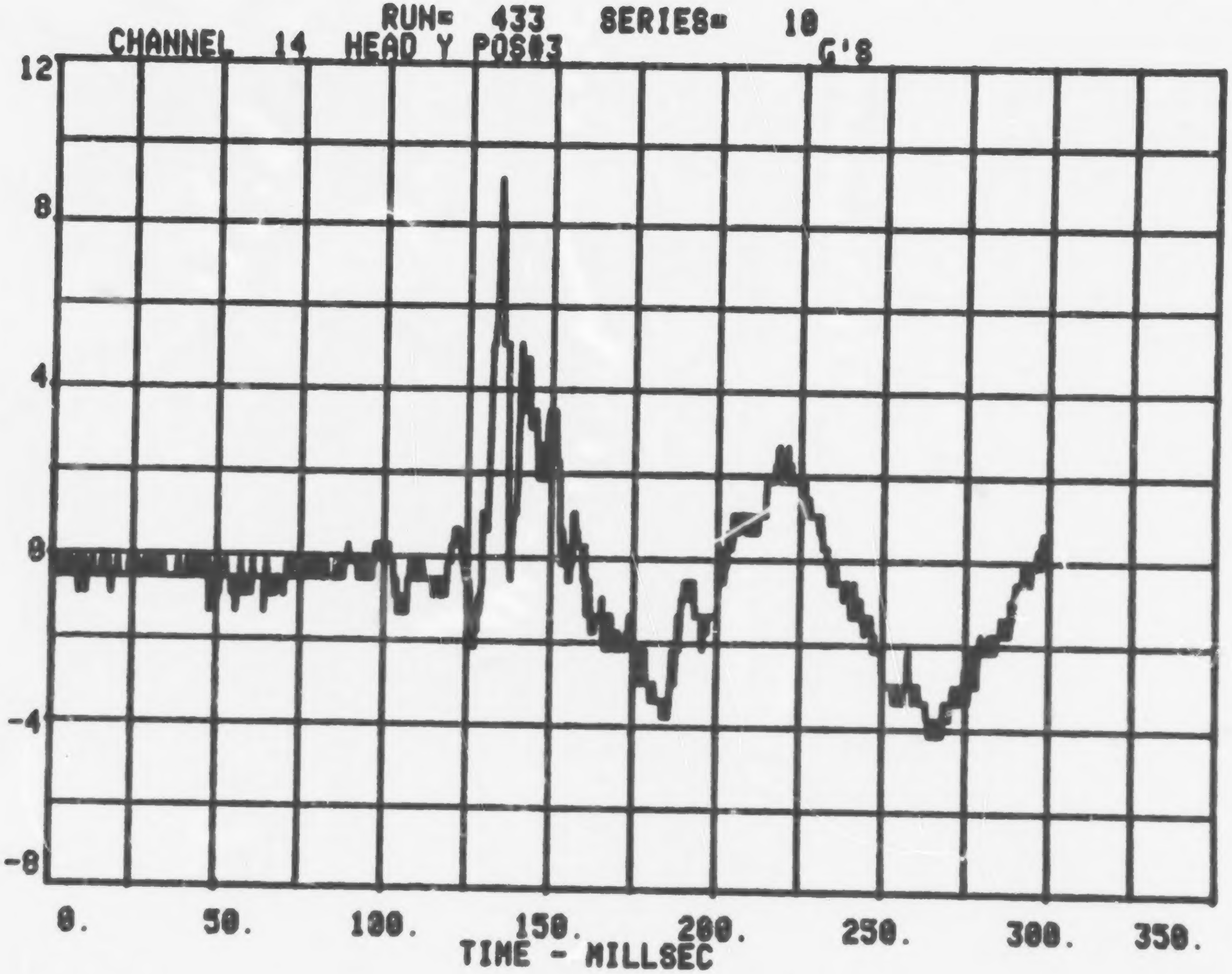

RUN= 433 SERIES= 10
CHANNEL 13 HEAD X POS03
G'S
20
0
-20
-40
-60
-80
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

M

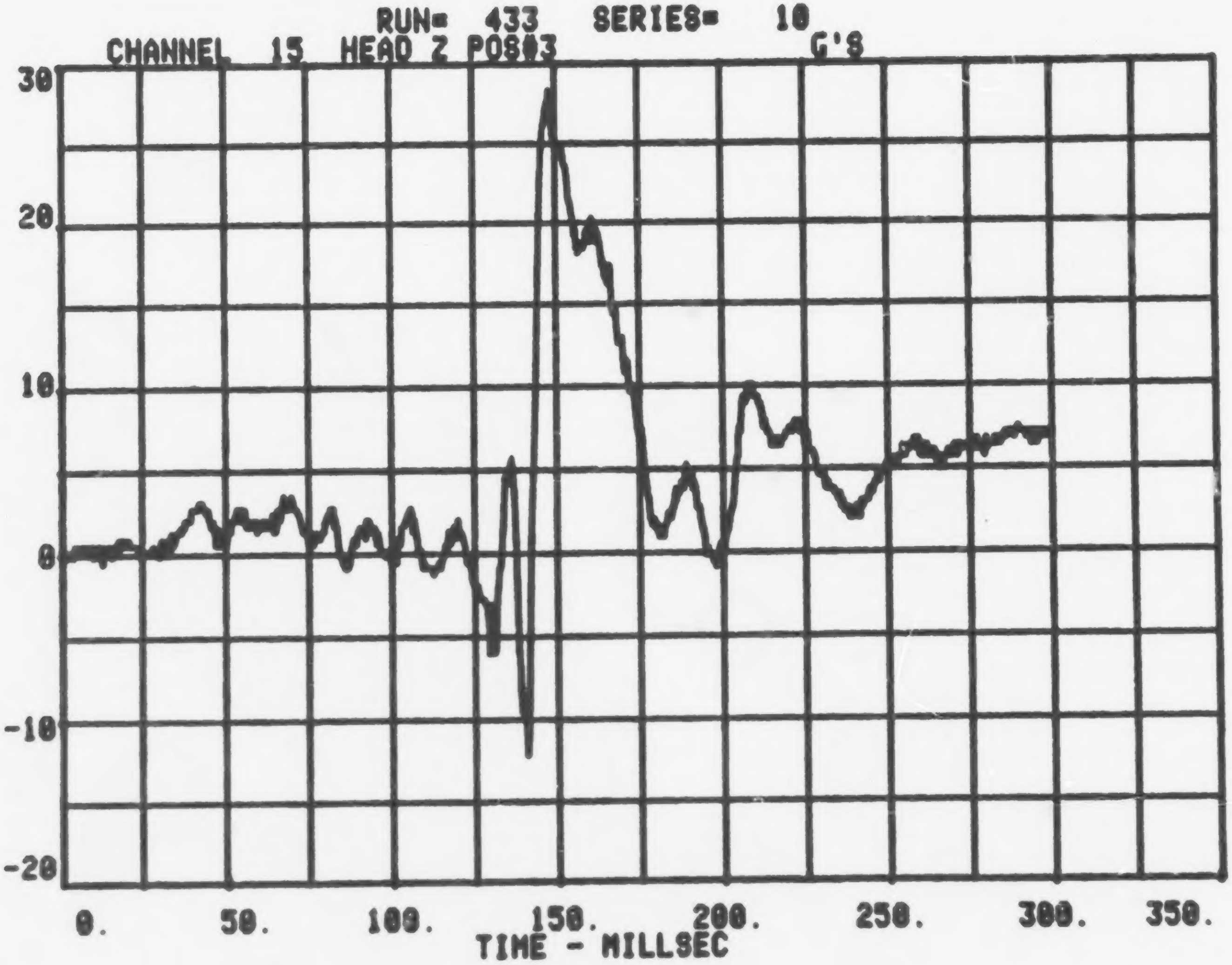
6440-V-6

797

798

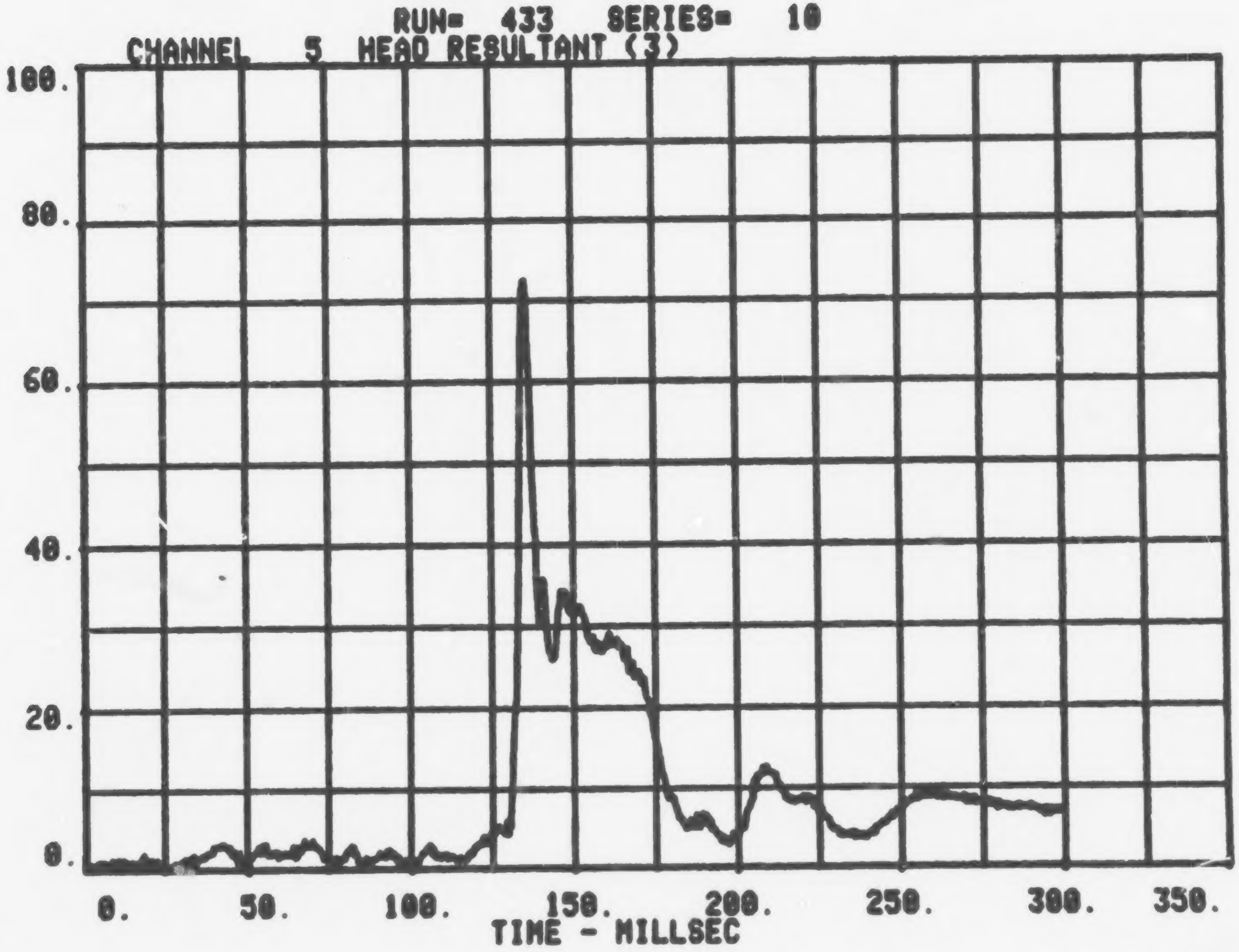

RUN= 433 SERIES= 10
CHANNEL 14 HEAD Y POS#3
G'S
12
8
4
0
-4
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

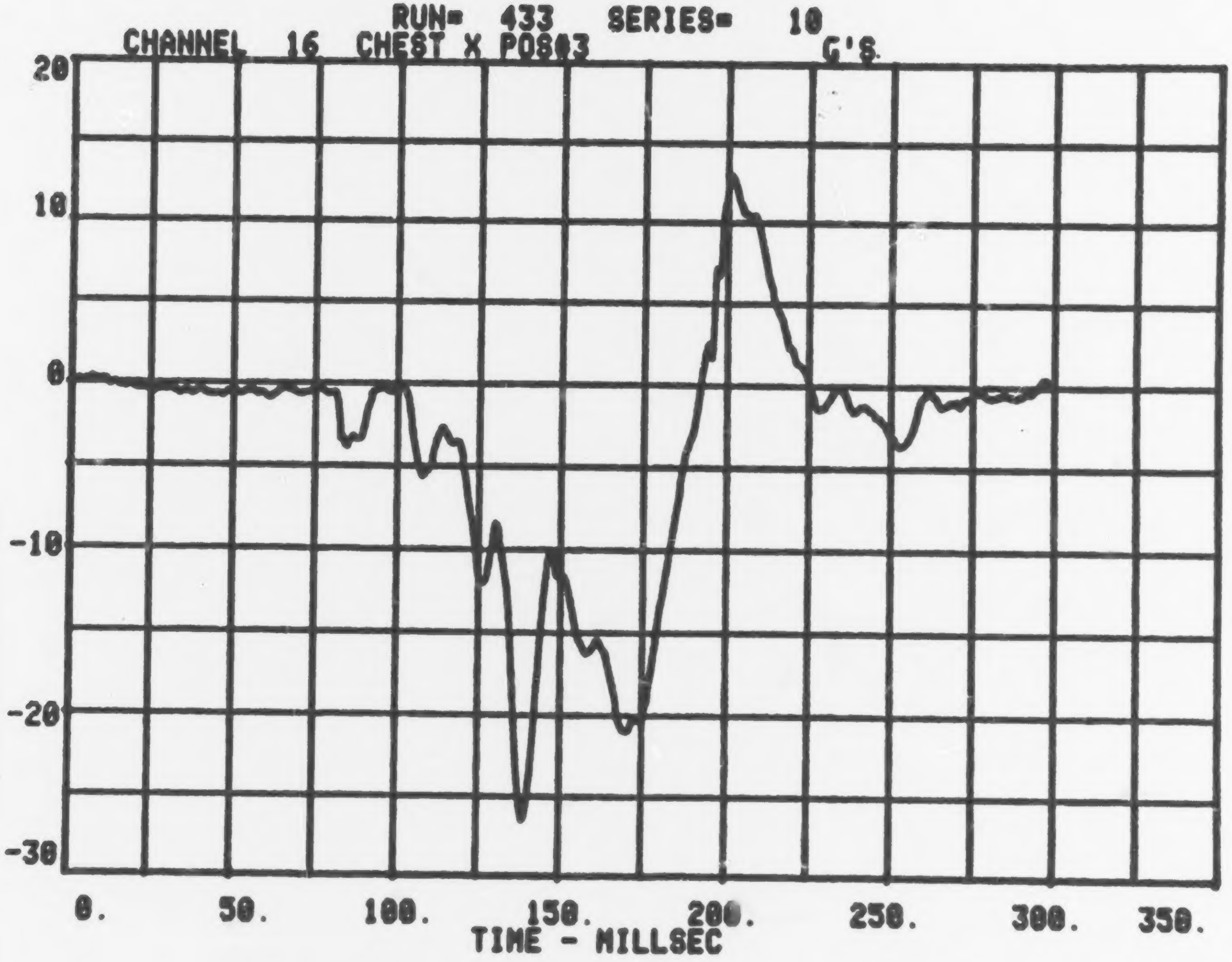

RUN= 433 SERIES= 10
CHANNEL 15 HEAD Z POS#3
G'S
30
20
10
0
-10
-20
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

800


RUN= 433 SERIES= 10
CHANNEL 5 HEAD RESULTANT (3)
100.
80.
60.
40.
20.
0.
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

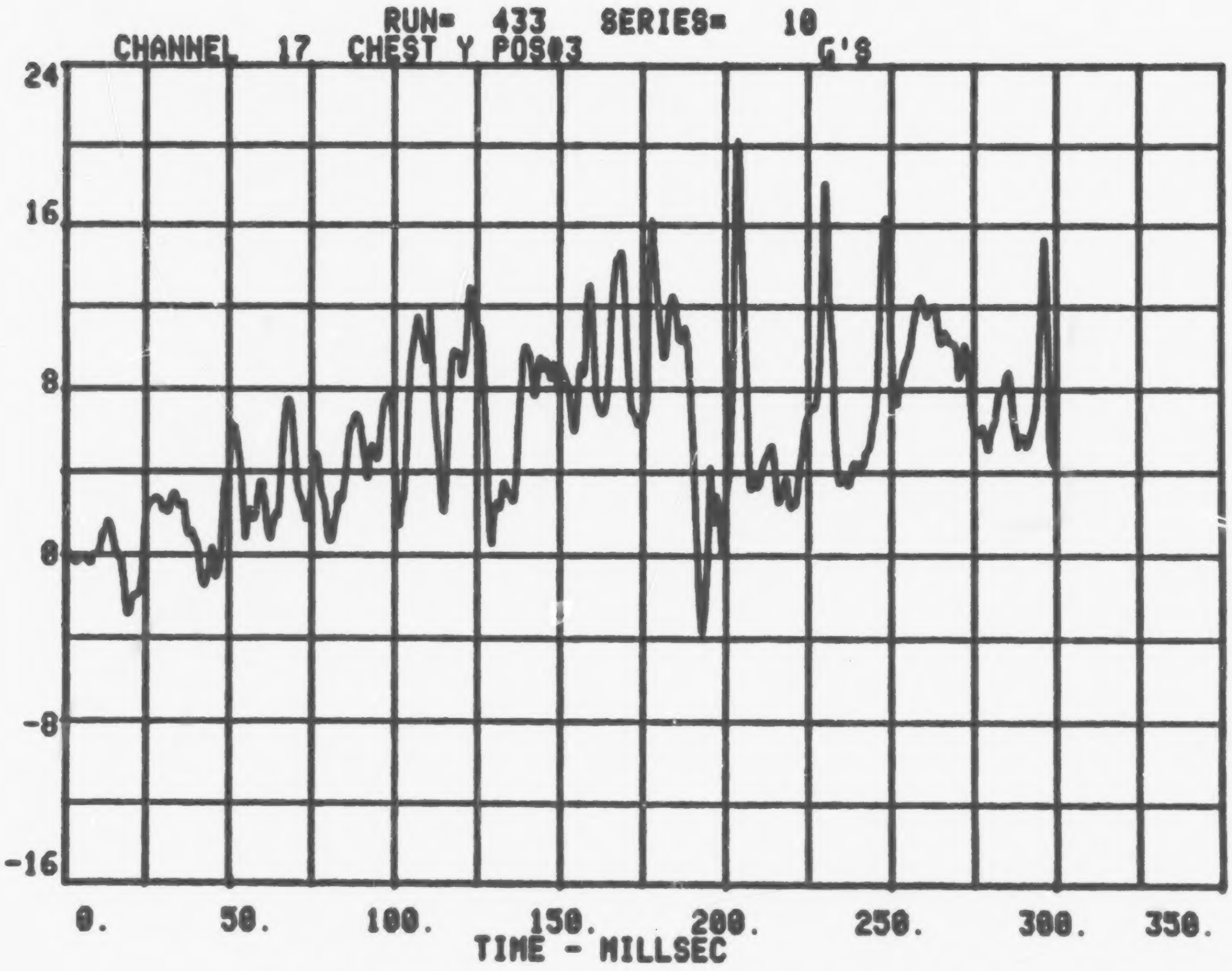
6440-V-6


RUN= 433 SERIES= 10
CHANNEL 16 CHEST X P0803
G'S
20
10
0
-10
-20
-30
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

801

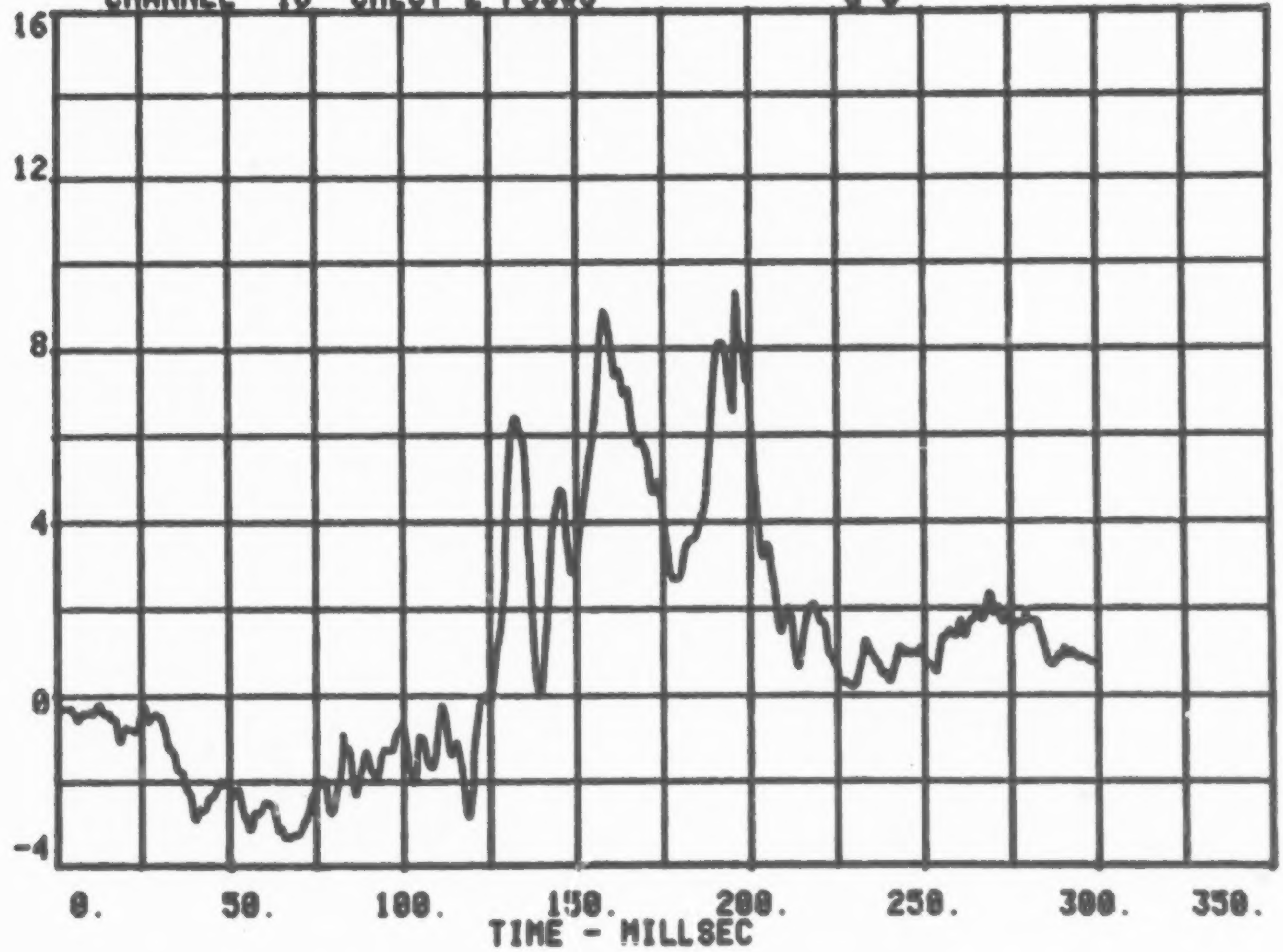
802


RUN= 433 SERIES= 10
CHANNEL 17 CHEST Y POS#3
G'S
24
16
8
0
-8
-16
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

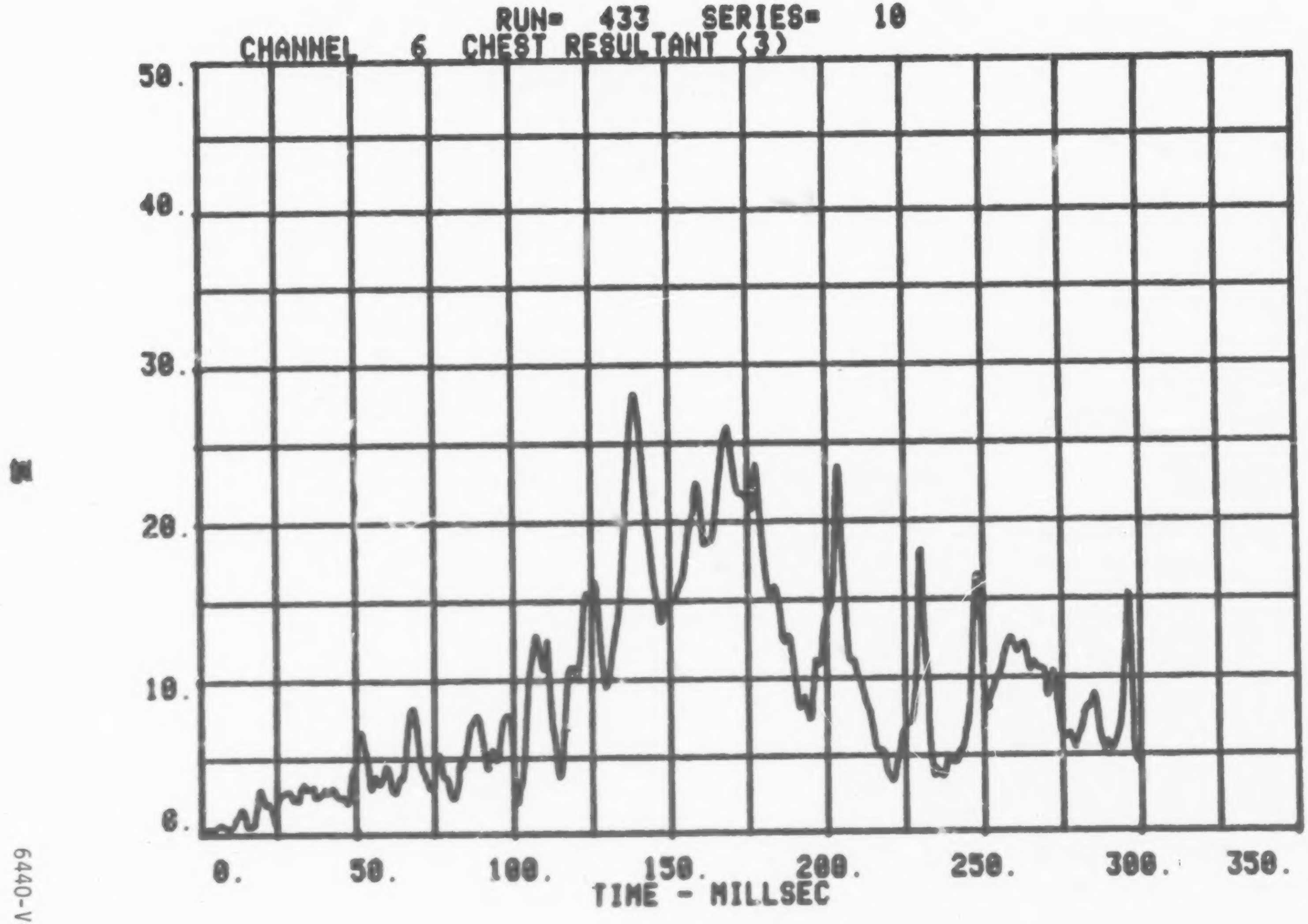
6440-V-6

RUN= 433 SERIES= 10

CHANNEL 10 CHEST Z POS03 G'S



804

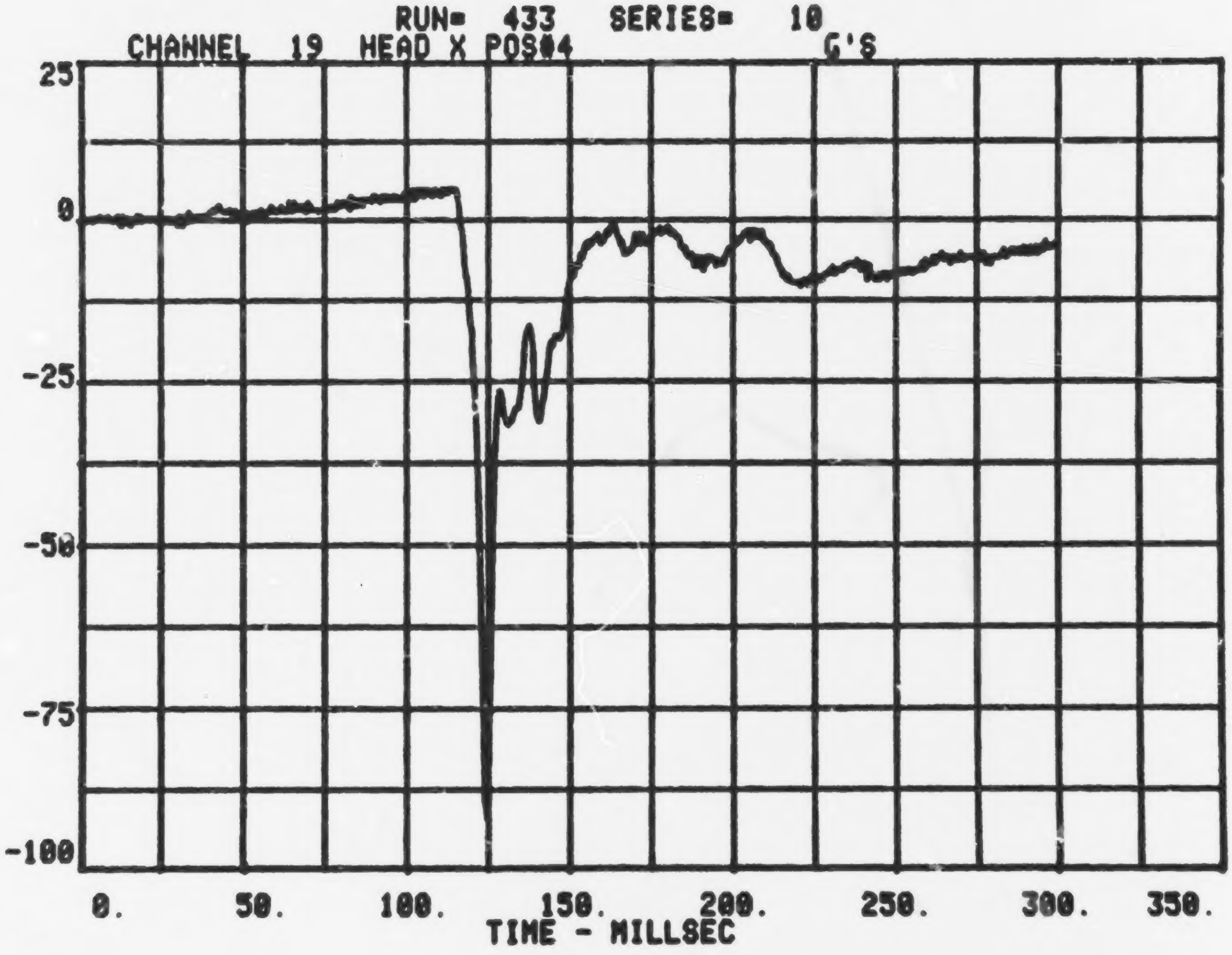

RUN= 433 SERIES= 10
CHANNEL 6 CHEST RESULTANT (3)
50.
40.
30.
20.
10.
0.
G
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

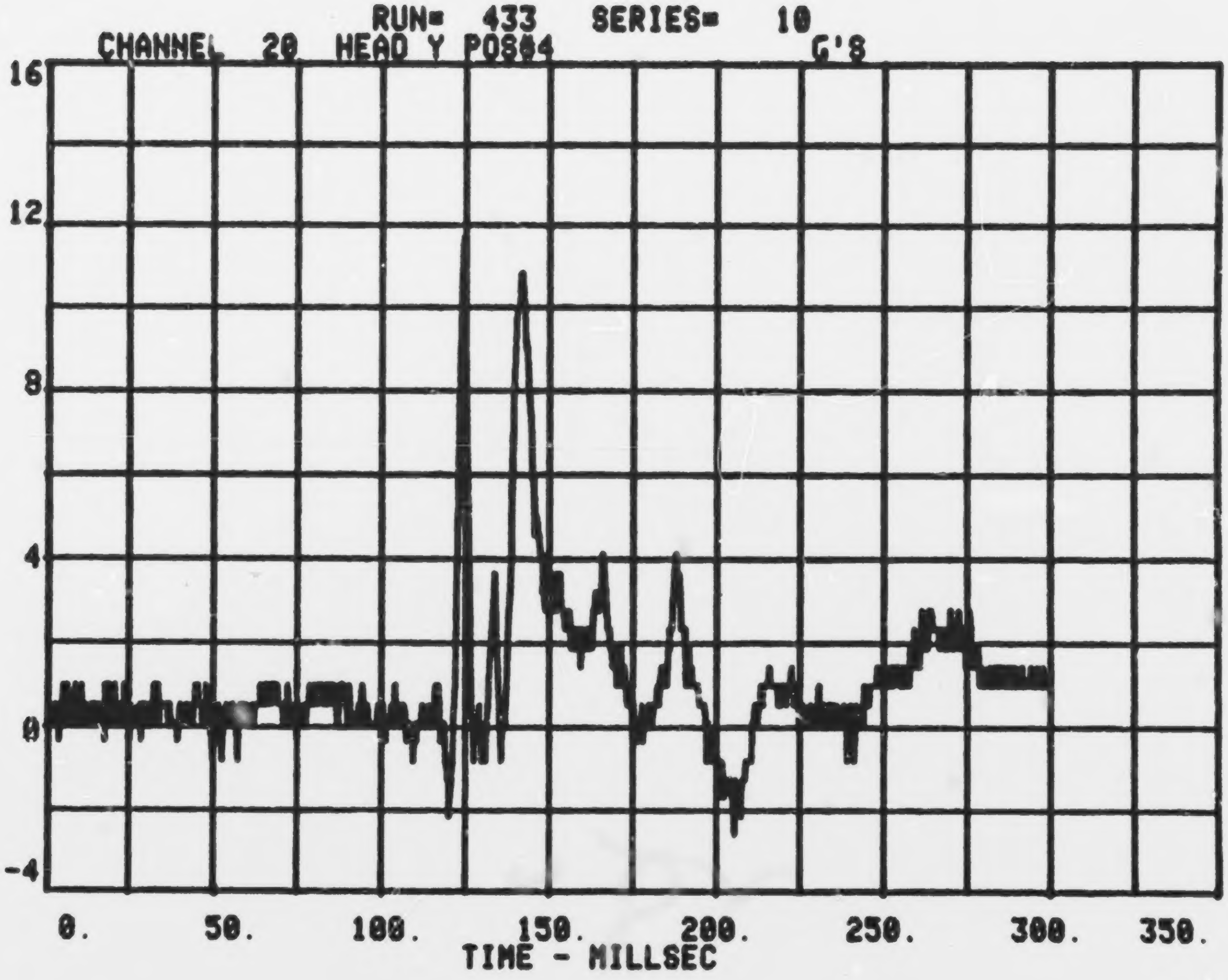
```
                    HEAD INJURY CRITERION
                     HEAD SEVERITY INDEX

                BUS TEST

                RUN= 433

                HEAD RESULTANT (4)

        HIC= 325.0   FROM T1= .12120   TO T2= .14250

        AVERAGE ACCELERATION BETWEEN T1 AND T2=  47.1G'S

        EVENT TIME= 300.0  MSEC

        SEVERITY INDEX= 484.7
```

6440-V-6

806


RUN= 433 SERIES= 10
CHANNEL 19 HEAD X POS#4
G'S
25
0
-25
-50
-75
-100
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

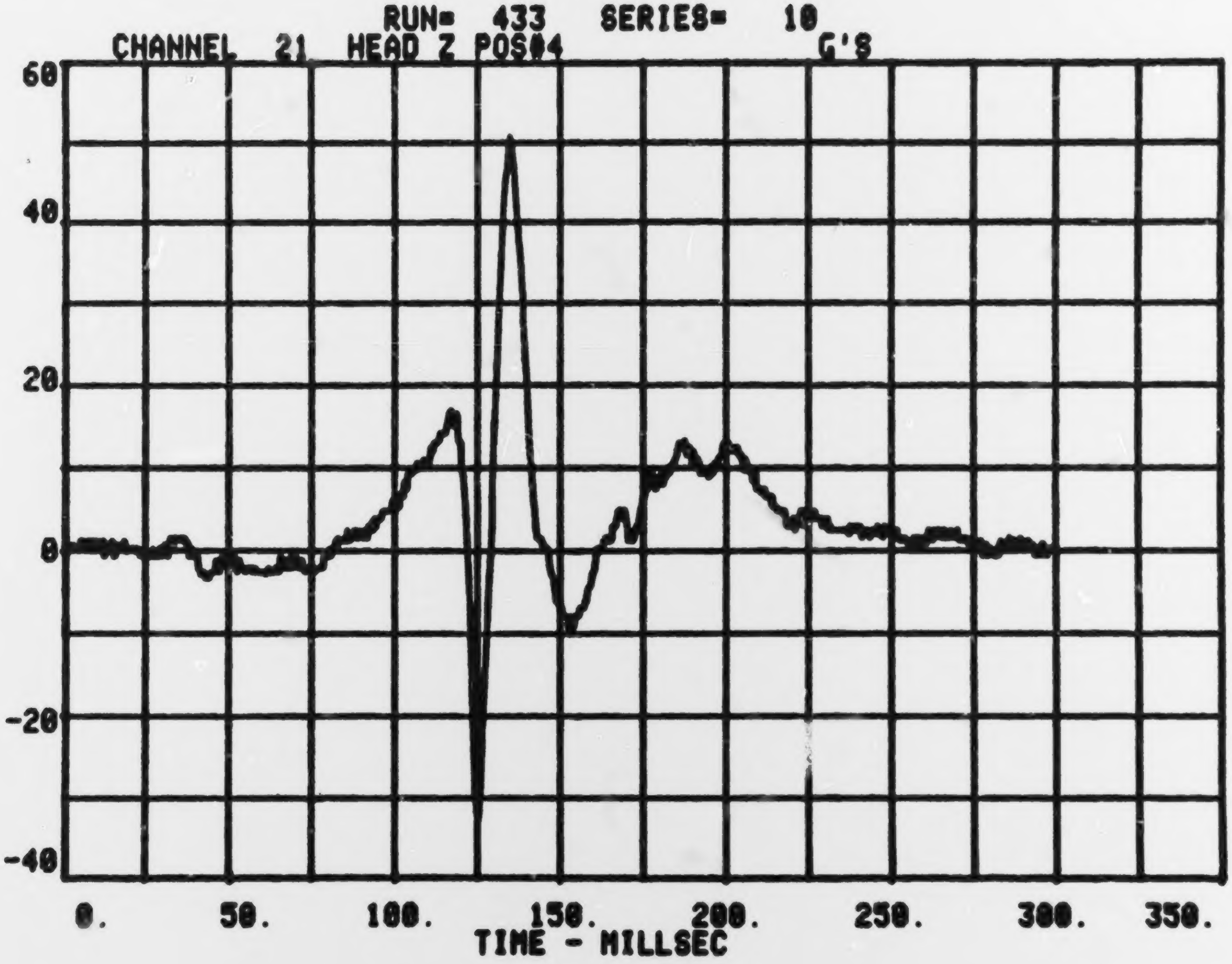
6440-V-6


RUN= 433 SERIES= 10
CHANNEL 20 HEAD Y POS04
G'S
16
12
8
4
0
-4
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

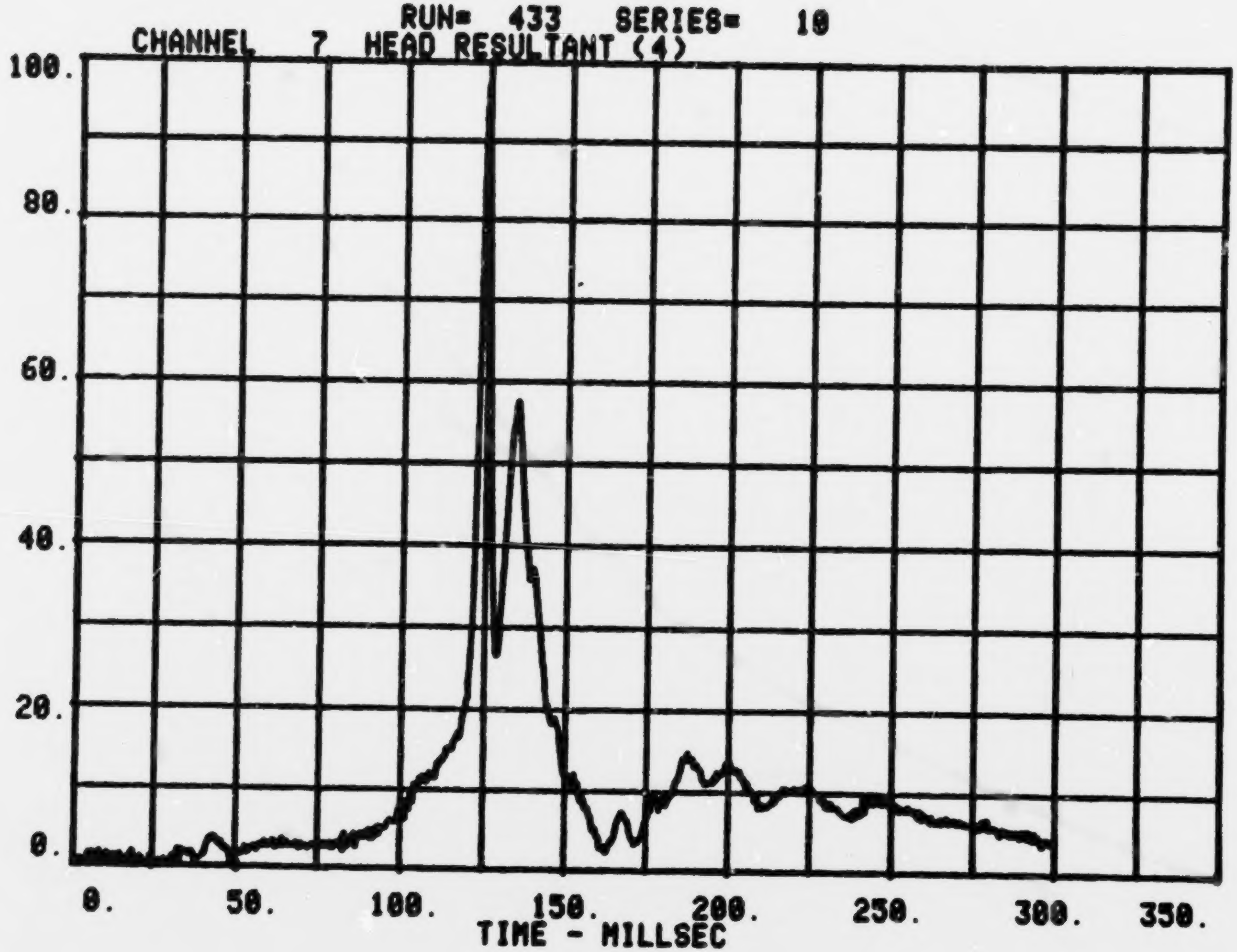
807

808



RUN= 433 SERIES= 10
CHANNEL 21 HEAD Z POS#4
G'S
60
40
20
0
-20
-40
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

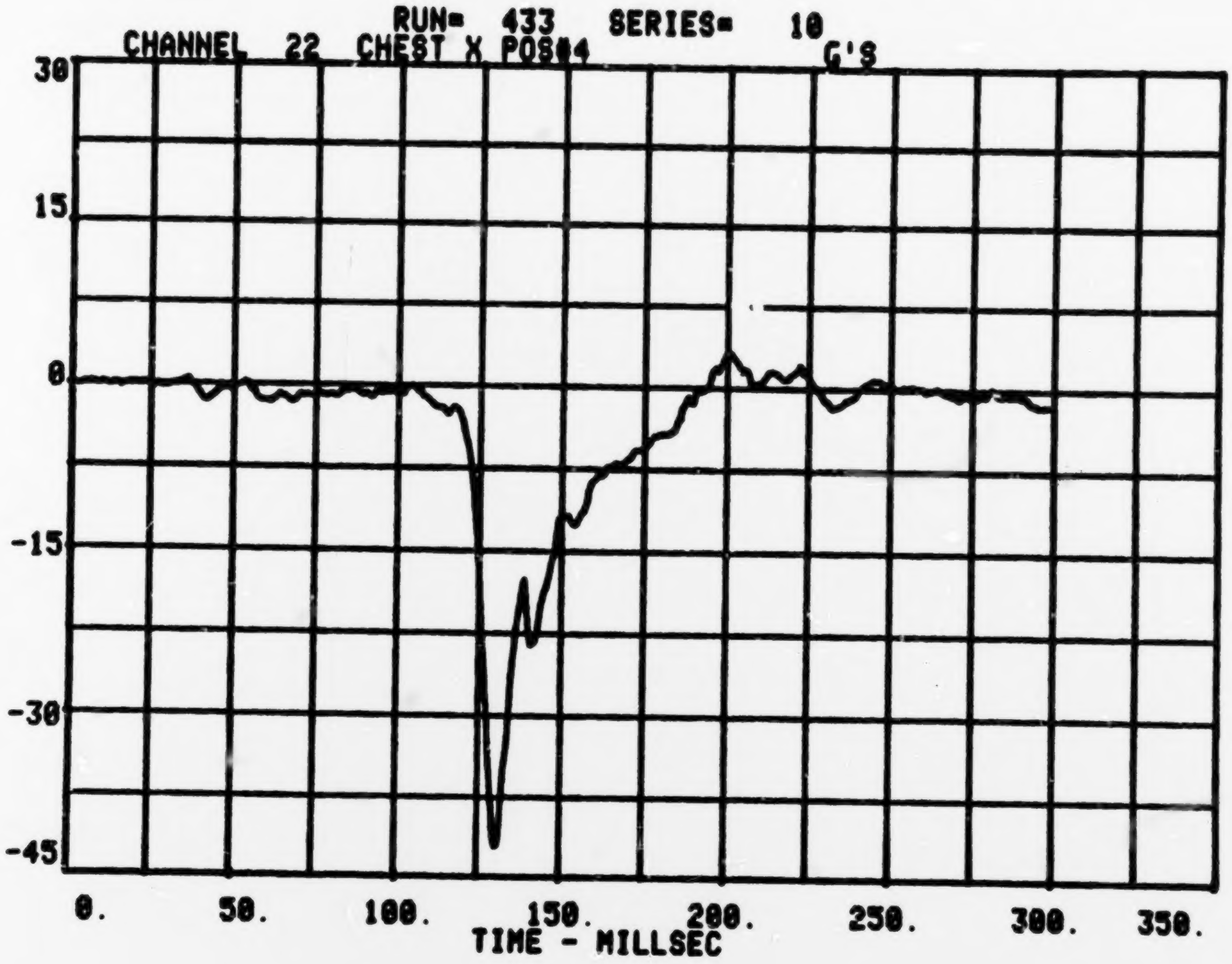
6440-V-6


RUN= 433 SERIES= 10
CHANNEL 7 HEAD RESULTANT (4)
100.
80.
60.
40.
20.
0.
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

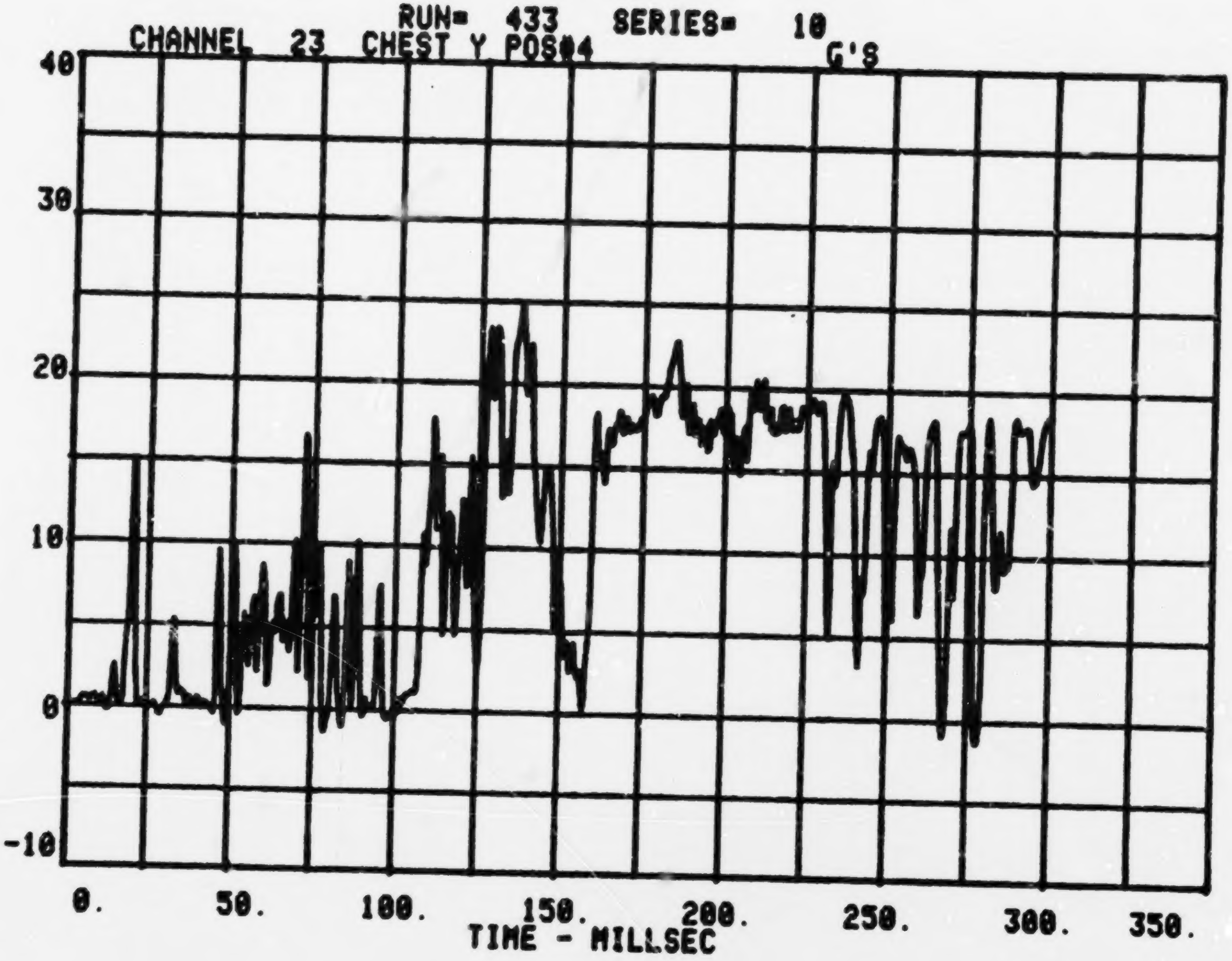
6440-V-6

809

810

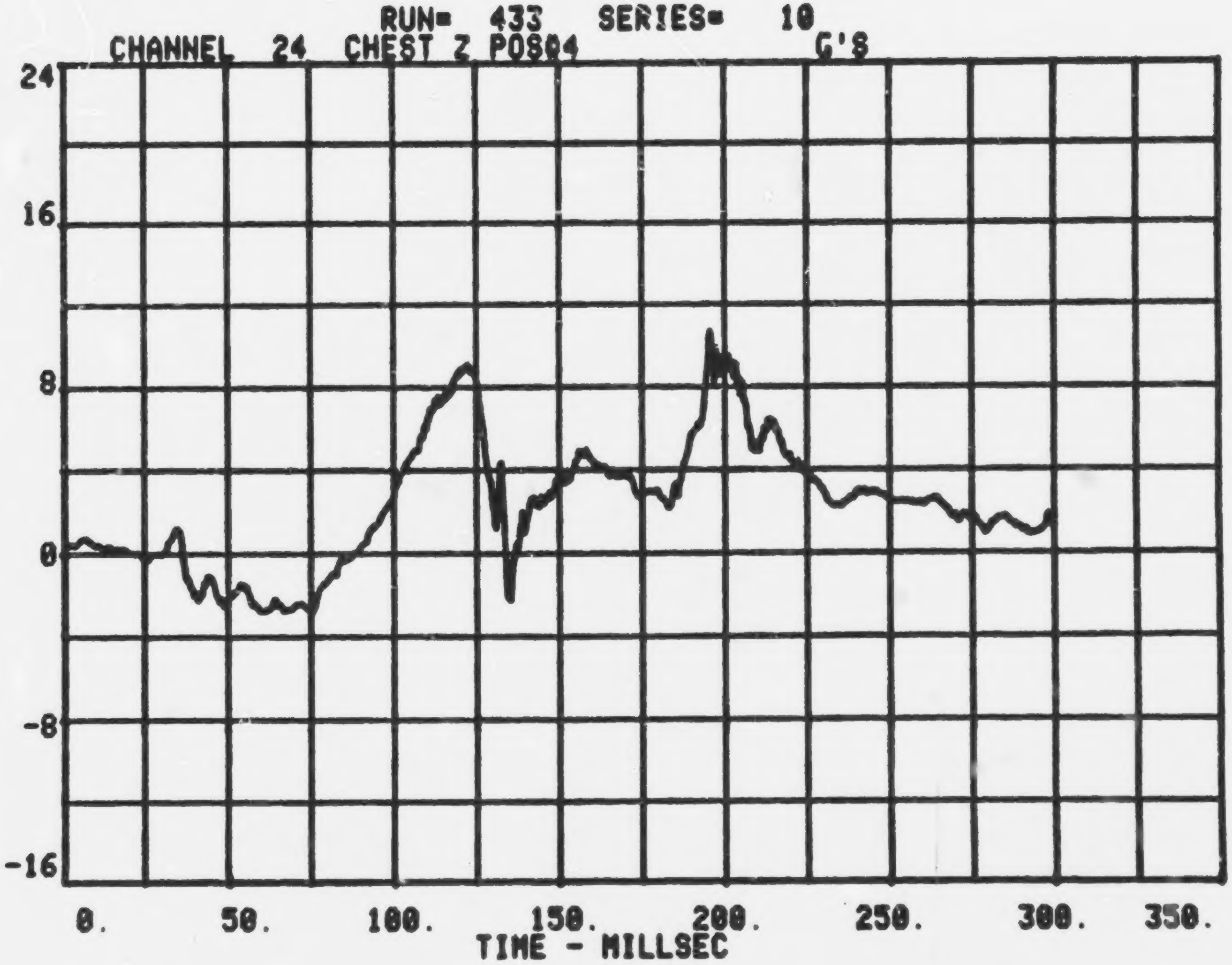

RUN= 433 SERIES= 10
CHANNEL 22 CHEST X POS#4
G'S
30
15
0
-15
-30
-45
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6


RUN= 433 SERIES= 10
CHANNEL 23 CHEST Y POS#4
G'S
40
30
20
10
0
-10
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

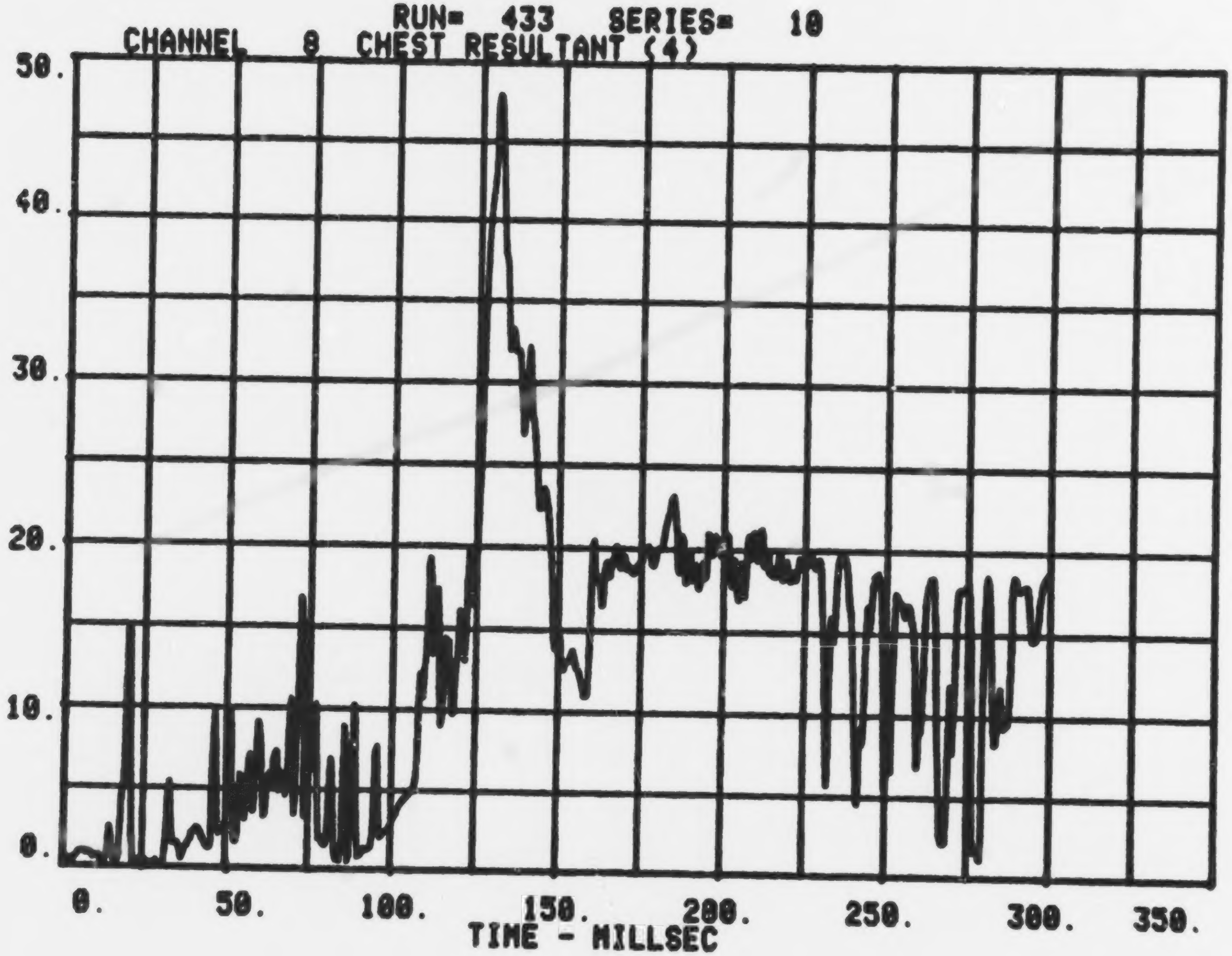
6440-V-6

812



RUN= 433 SERIES= 10
CHANNEL 24 CHEST Z P0804
G'S
24
16
8
0
-8
-16
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

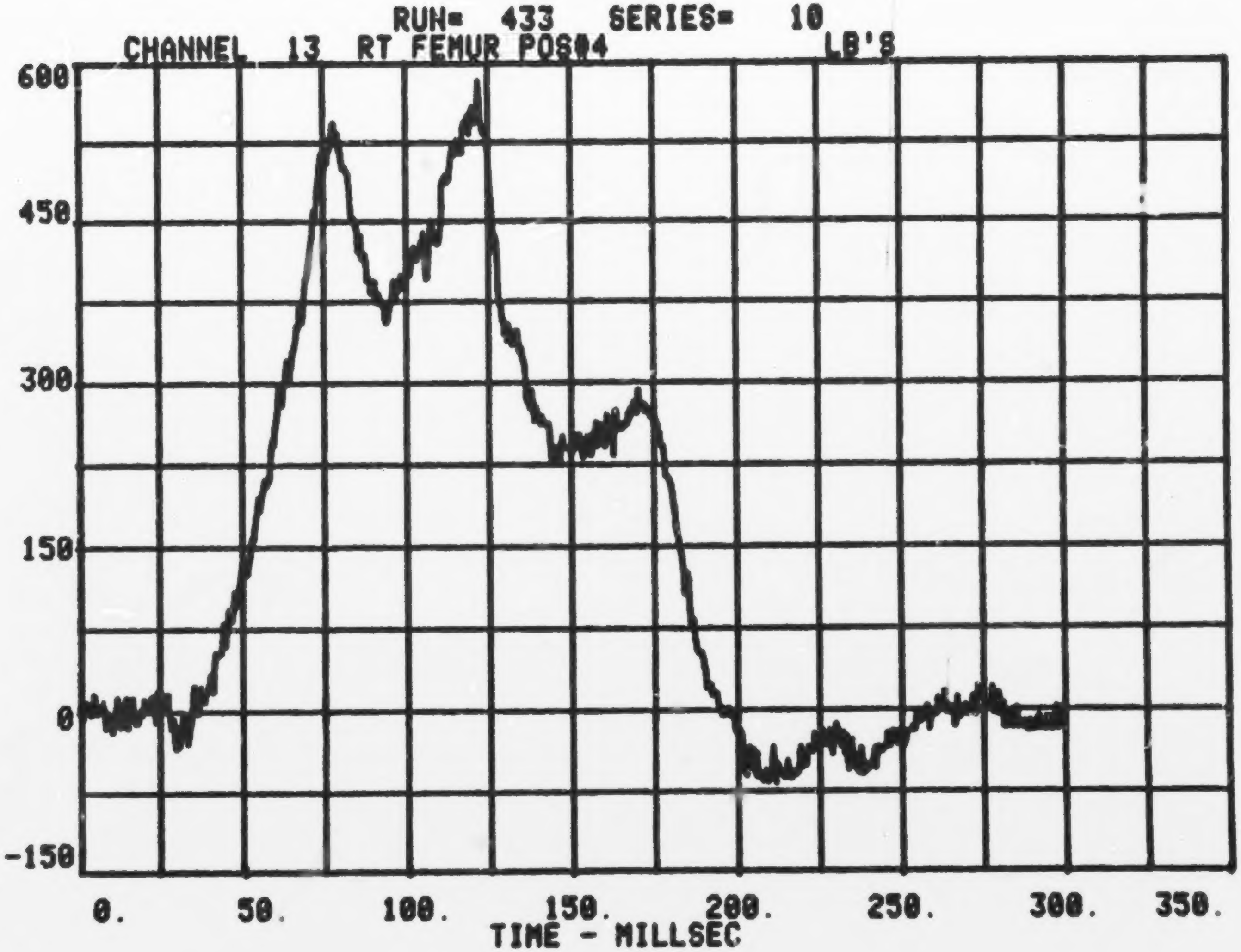
6440-V-6


RUN= 433 SERIES= 10
CHANNEL 8 CHEST RESULTANT (4)
50.
40.
30.
20.
10.
0.
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

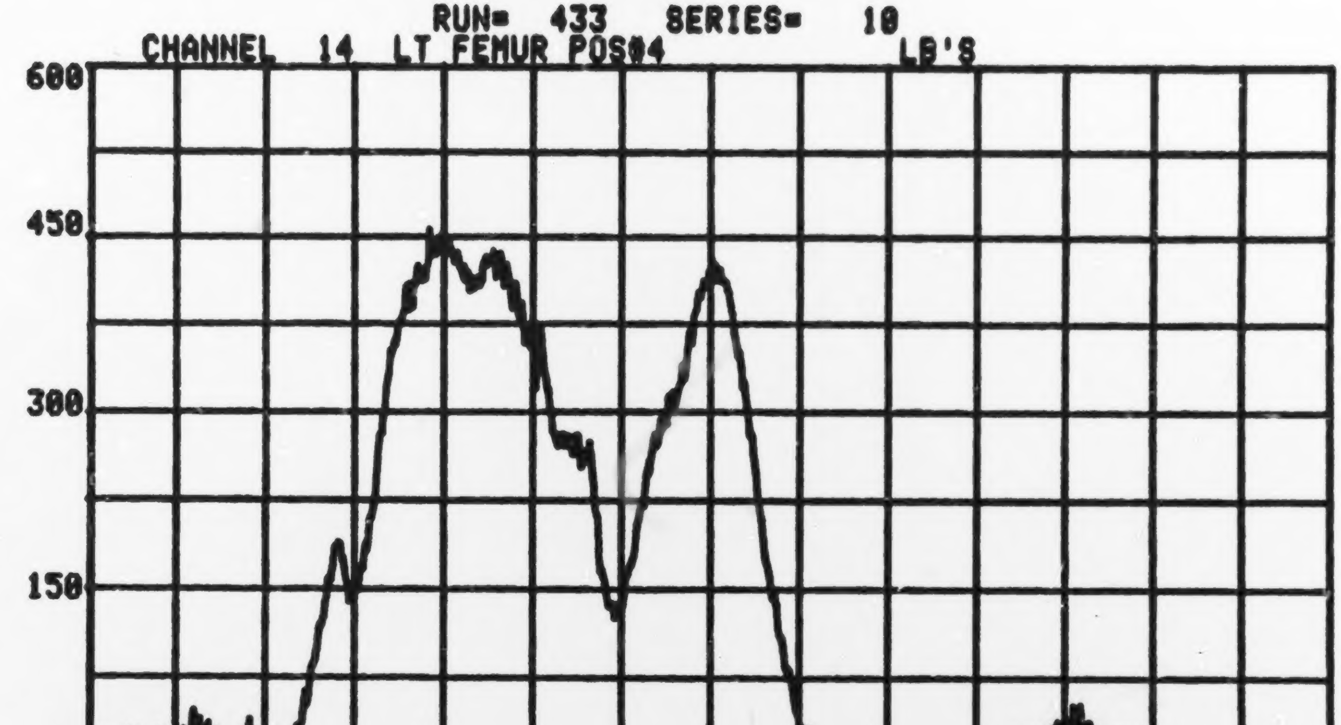
6440-V-6

813

814


RUN= 433 SERIES= 10
CHANNEL 13 RT FEMUR POS#4
LB'S
600
450
300
150
0
-150
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6


RUN= 433 SERIES= 10
CHANNEL 14 LT FEMUR POS#4
LB'S
600
450
300
150
0
-150
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

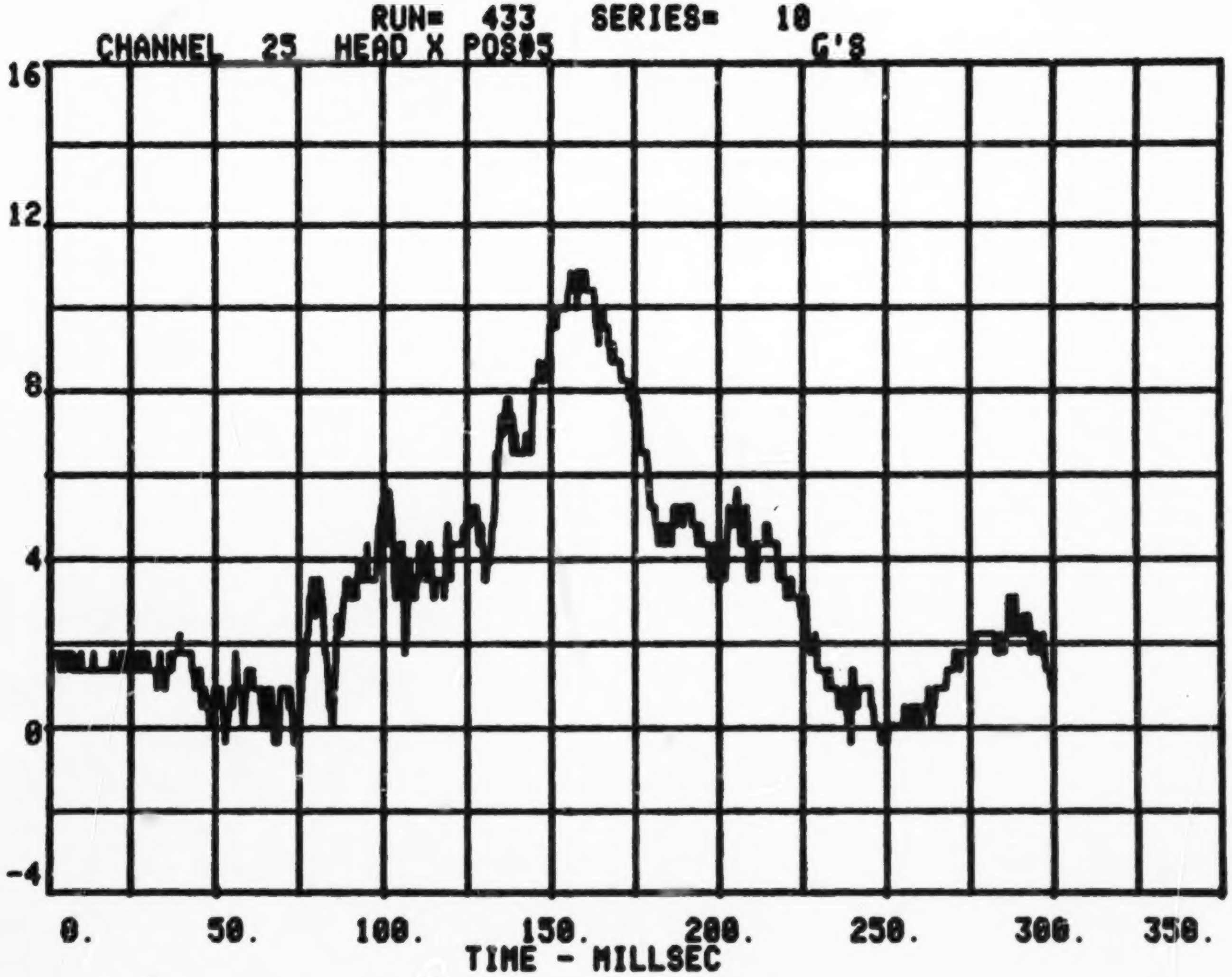
815

6440-V-6

816

```
                HEAD INJURY CRITERION
                 HEAD SEVERITY INDEX

          BUS TEST

          RUN= 433

          HEAD RESULTANT (5)

     HIC= 100.9   FROM T1= .10590   TO T2= .18360

     AVERAGE ACCELERATION BETWEEN T1 AND T2=  17.6G'S

     EVENT TIME= 300.0  MSEC

     SEVERITY INDEX= 131.8
```

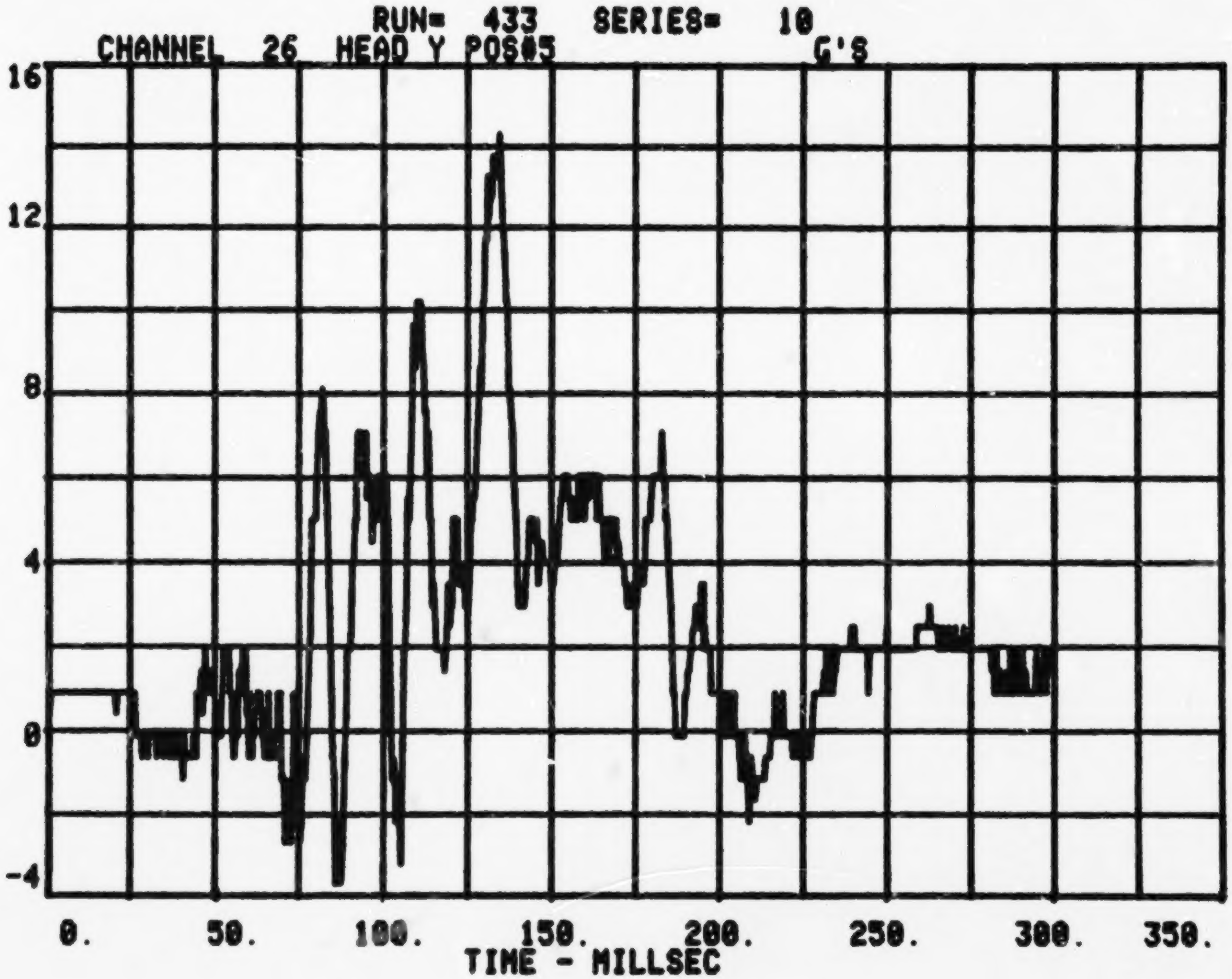
6440-V-6

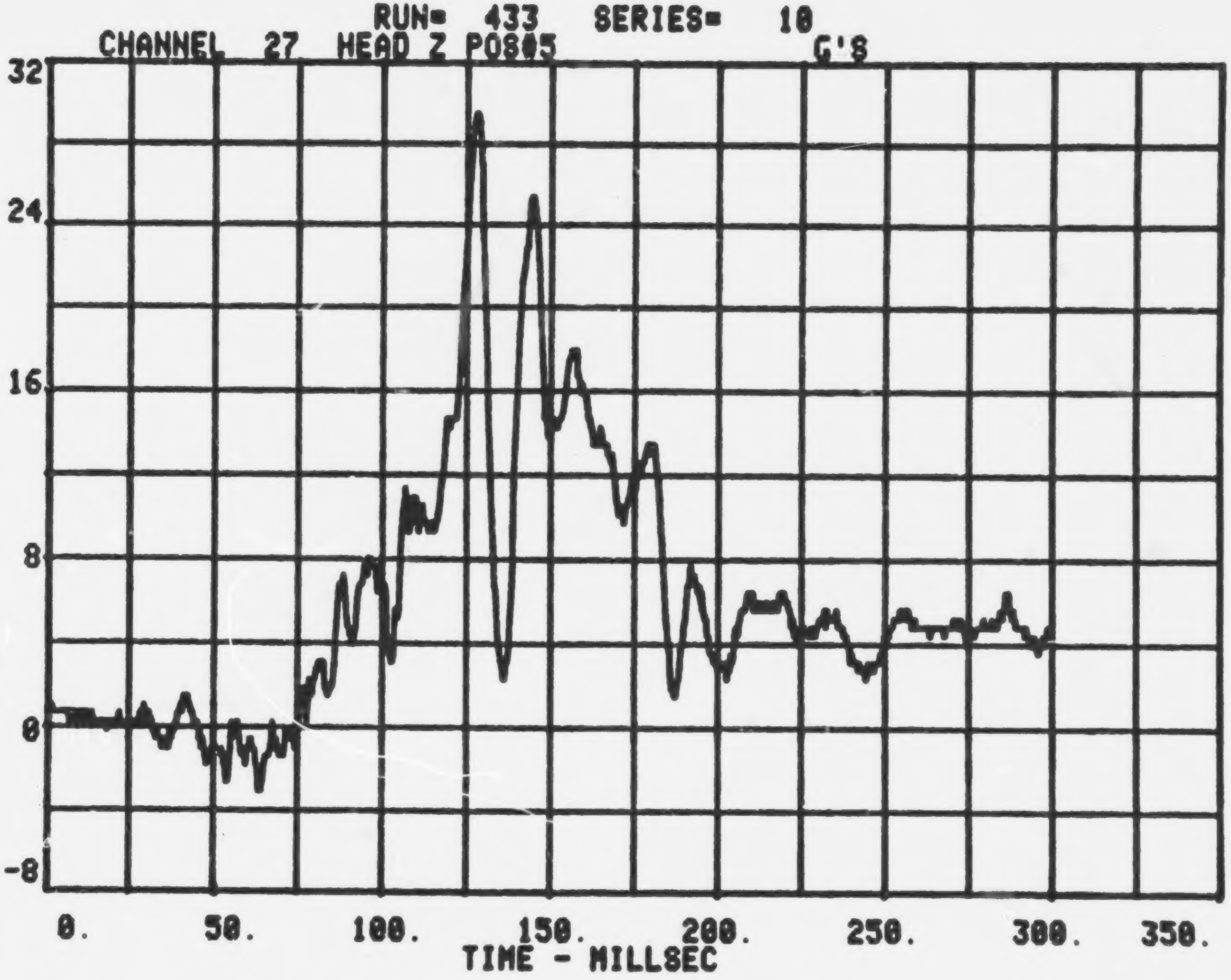

RUN= 433 SERIES= 10
CHANNEL 25 HEAD X POS#5
G'S
16
12
8
4
0
-4
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

817

6440-V-6

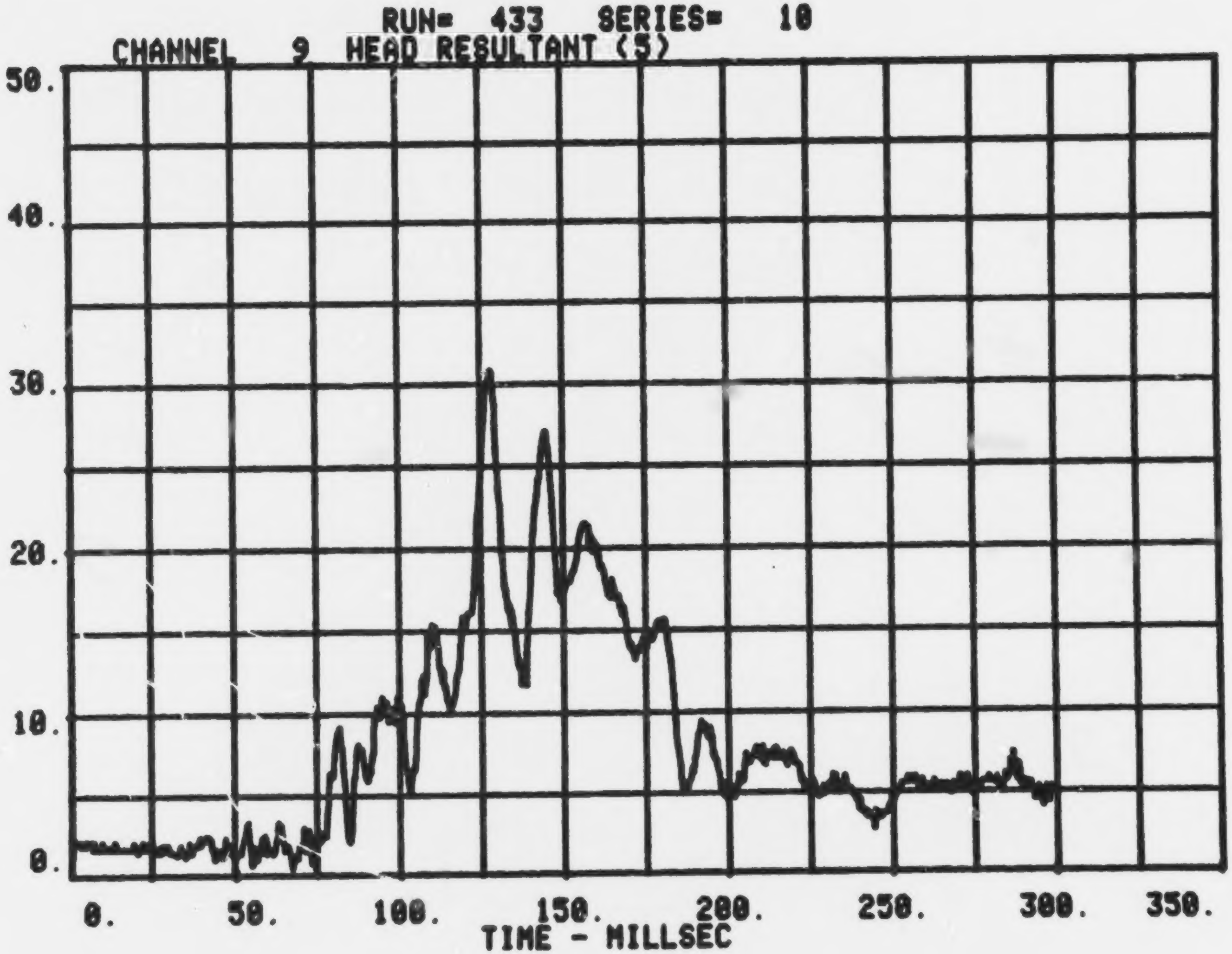
818


RUN= 433 SERIES= 10
CHANNEL 26 HEAD Y POS#5
G'S
16
12
8
4
0
-4
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

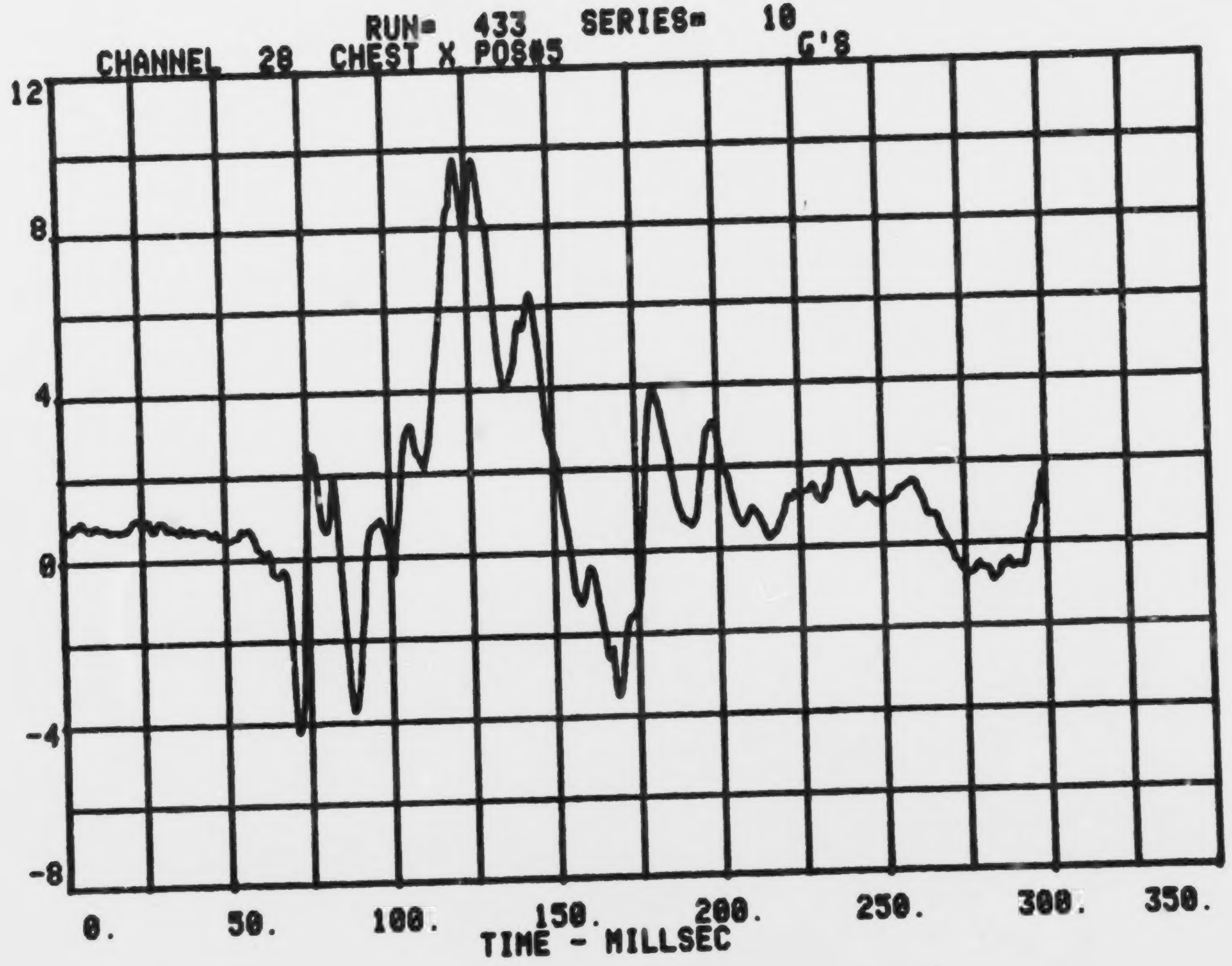

RUN= 433 SERIES= 10
CHANNEL 27 HEAD Z POS#5
G'S
32
24
16
8
0
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

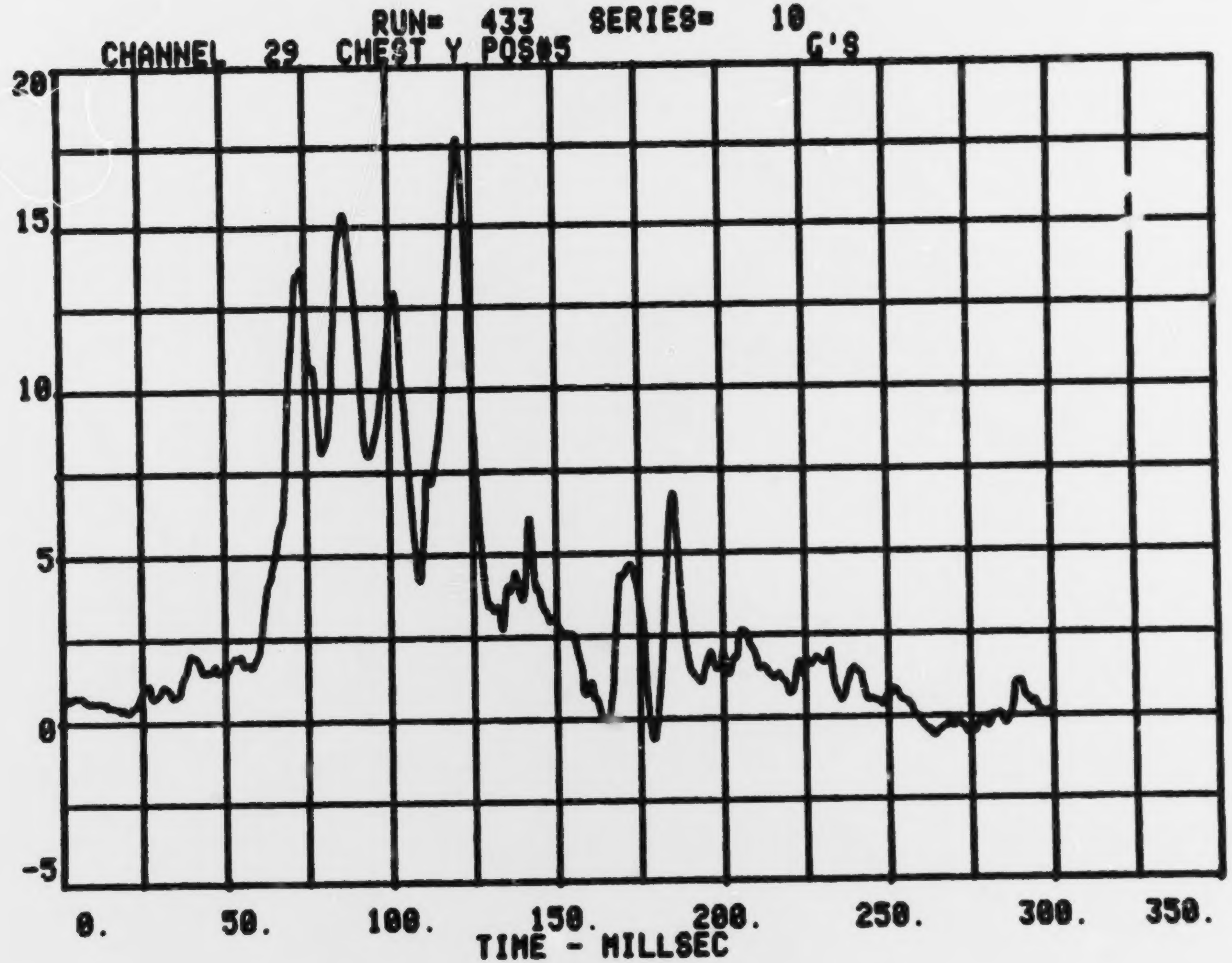
6440-V-6

820

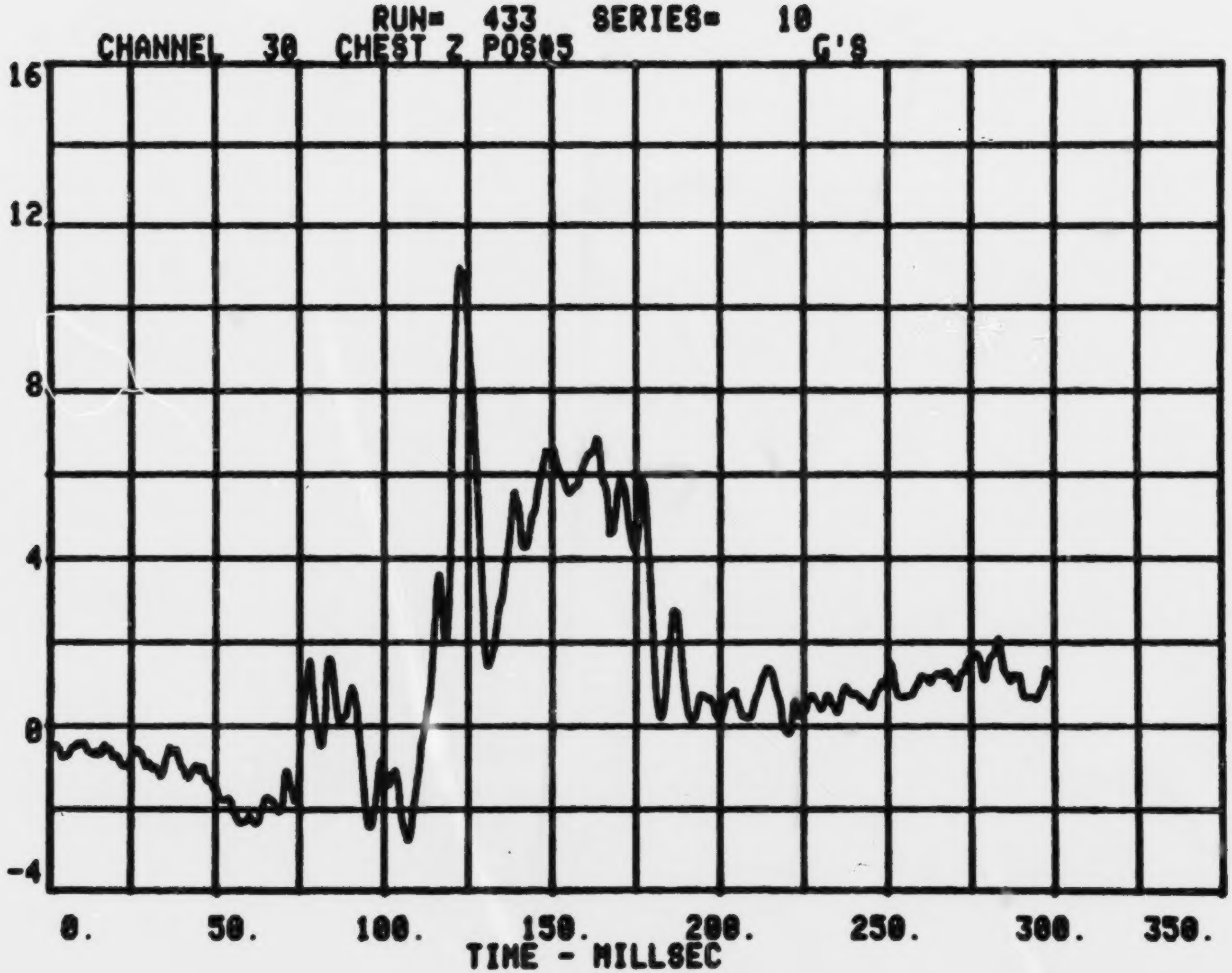

RUN= 433 SERIES= 10
CHANNEL 9 HEAD RESULTANT (5)

6440-V-6


RUN= 433 SERIES= 10
CHANNEL 28 CHEST X POS#5
G'S
12
8
4
0
-4
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

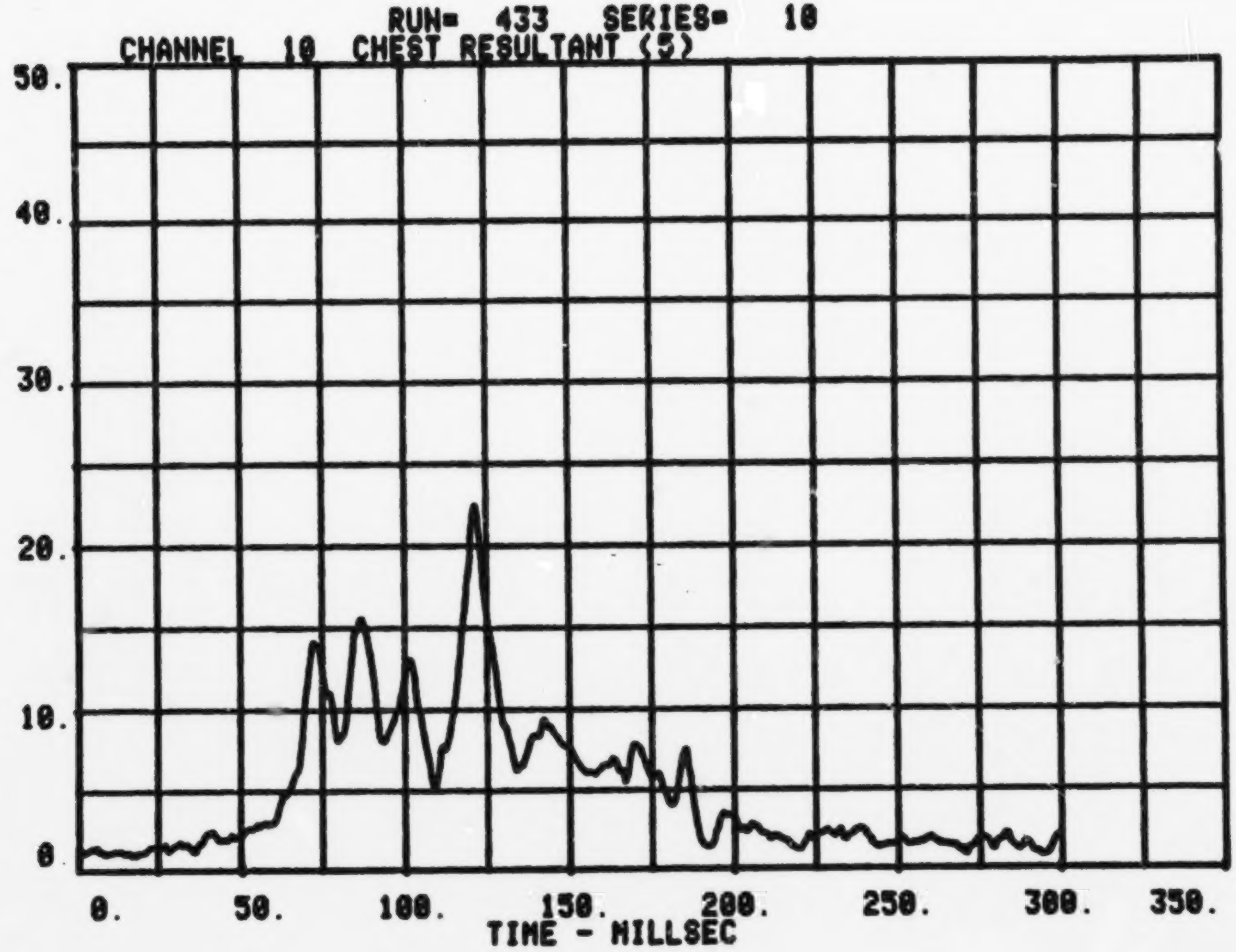

RUN= 433 SERIES= 10
CHANNEL 29 CHEST Y POS#5
G'S
20
15
10
5
0
-5
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6


RUN= 433 SERIES= 10
CHANNEL 30 CHEST Z POS05
G'S
16
12
8
4
0
-4
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

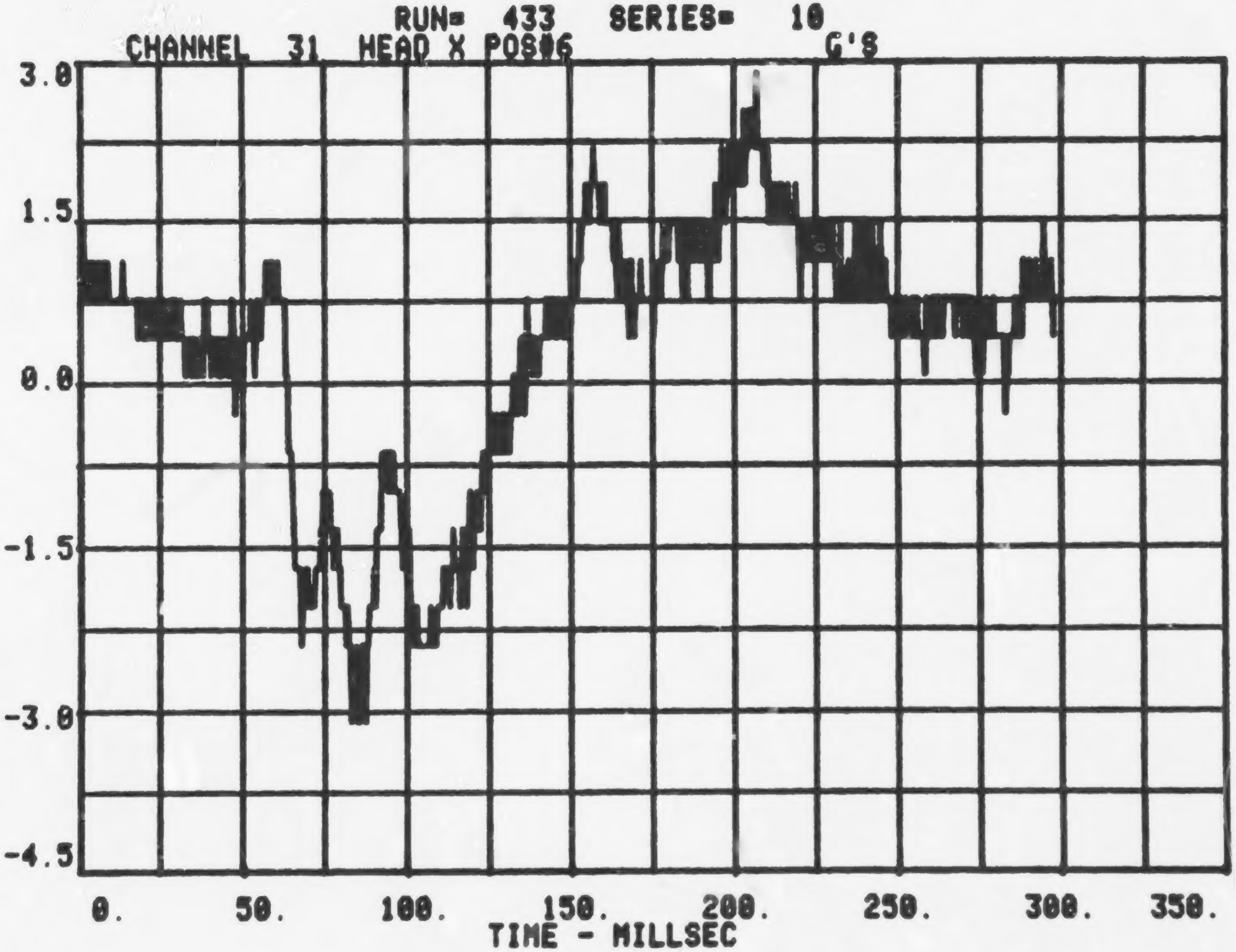
824



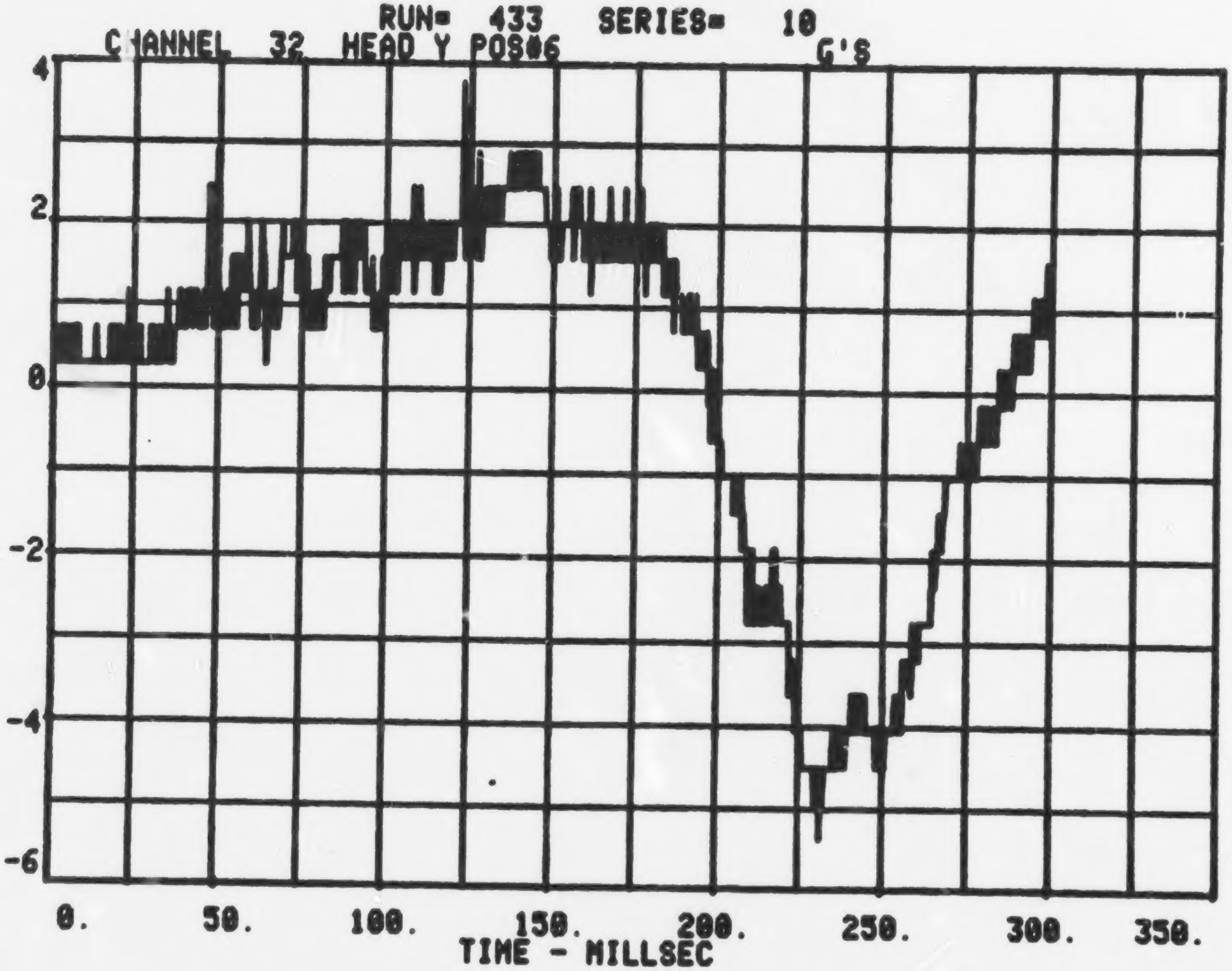
RUN= 433 SERIES= 10
CHANNEL 10 CHEST RESULTANT (5)
50.
40.
30.
20.
10.
0
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

```
                    HEAD INJURY CRITERION
                     HEAD SEVERITY INDEX

              BUS TEST

              RUN= 433

              HEAD RESULTANT (6)

        HIC=  87.0   FROM T1= .14100   TO T2= .24390

        AVERAGE ACCELERATION BETWEEN T1 AND T2=  14.8G'S

        EVENT TIME= 300.0  MSEC

        SEVERITY INDEX= 106.9
```

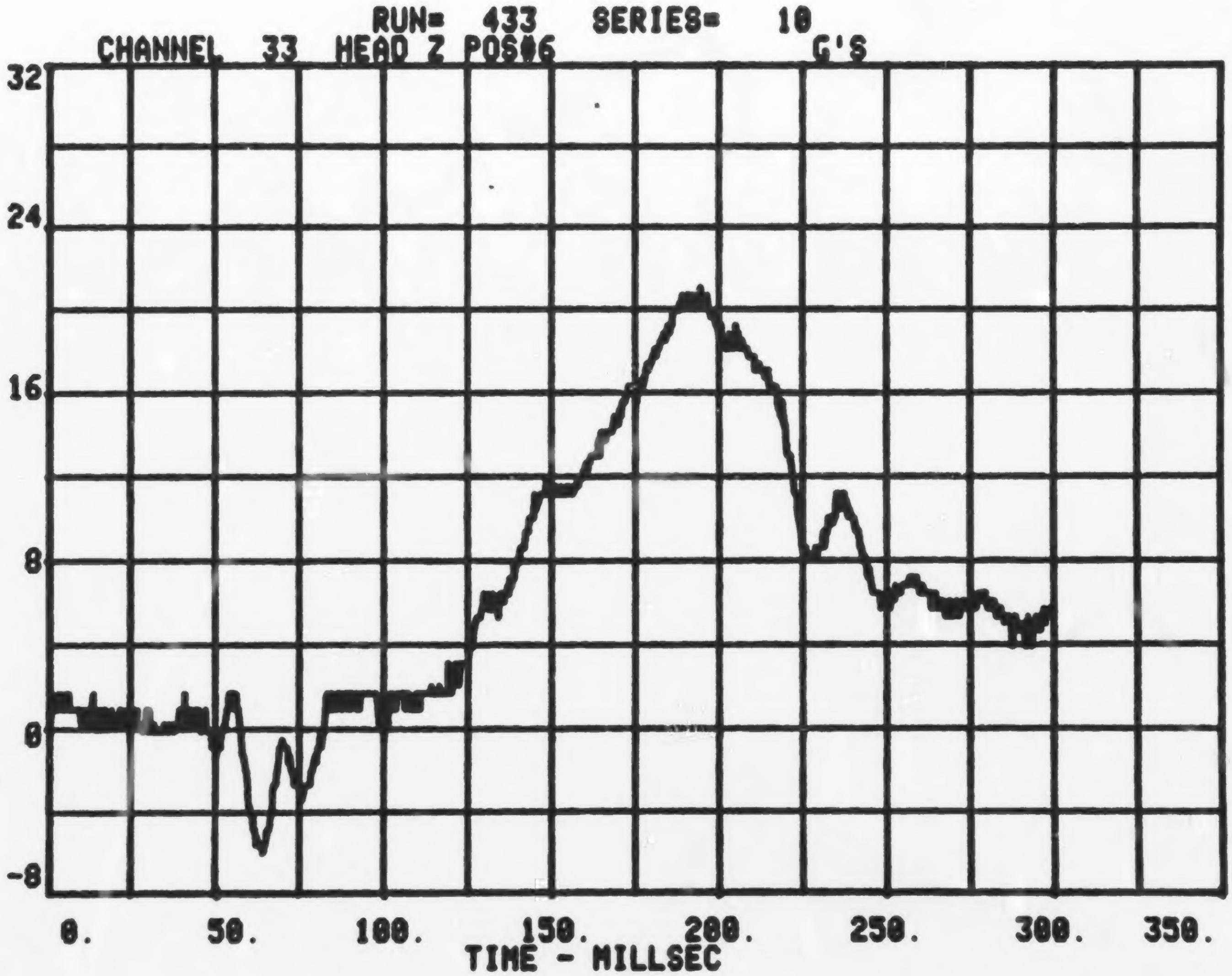

RUN= 433 SERIES= 10
CHANNEL 31 HEAD X POS06 G'S
3.0
1.5
0.0
-1.5
-3.0
-4.5
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

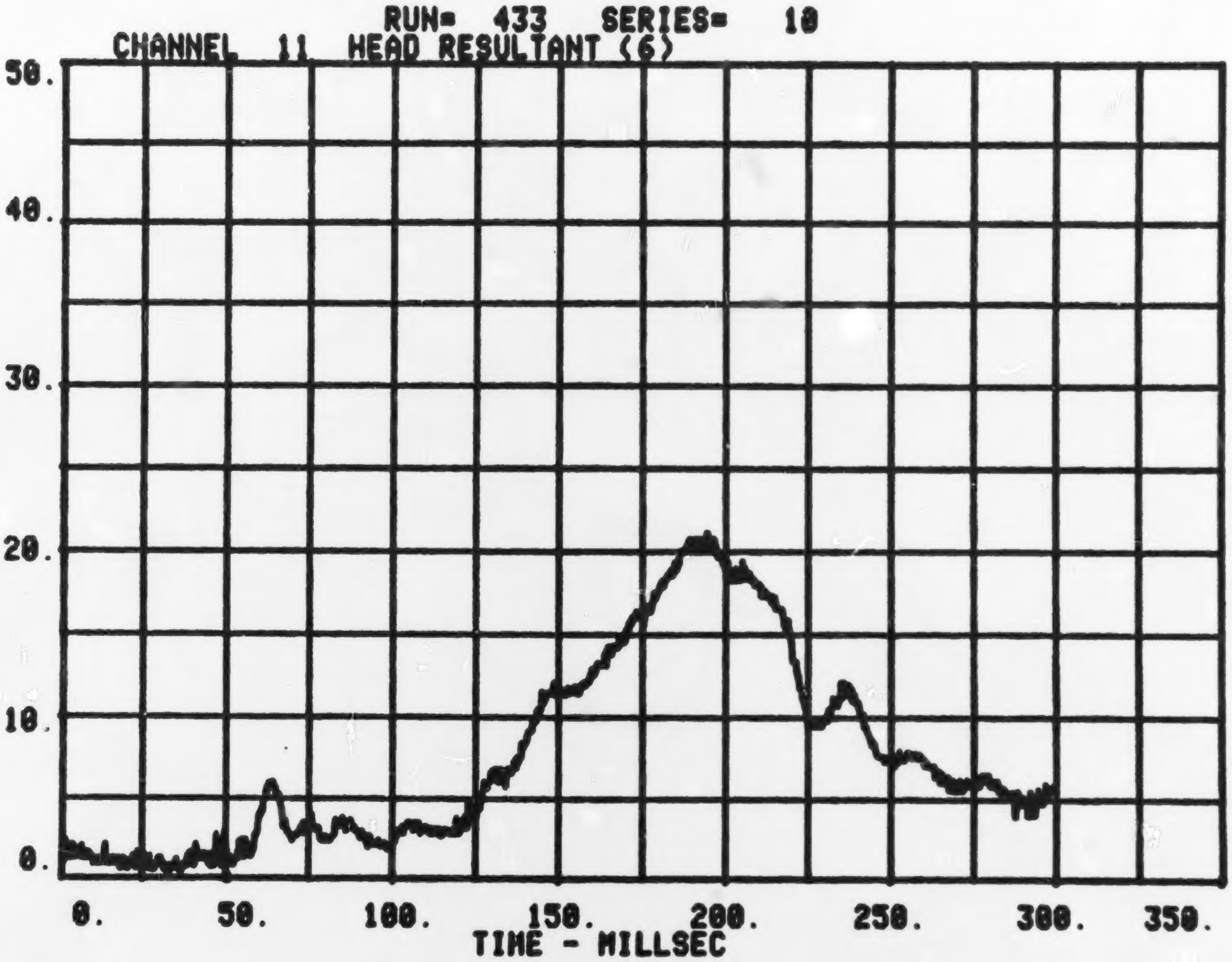

RUN= 433 SERIES= 10
CHANNEL 32 HEAD Y POS#6
G'S
4
2
0
-2
-4
-6
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

828


RUN= 433 SERIES= 10
CHANNEL 33 HEAD Z POS#6
G'S
32
24
16
8
0
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

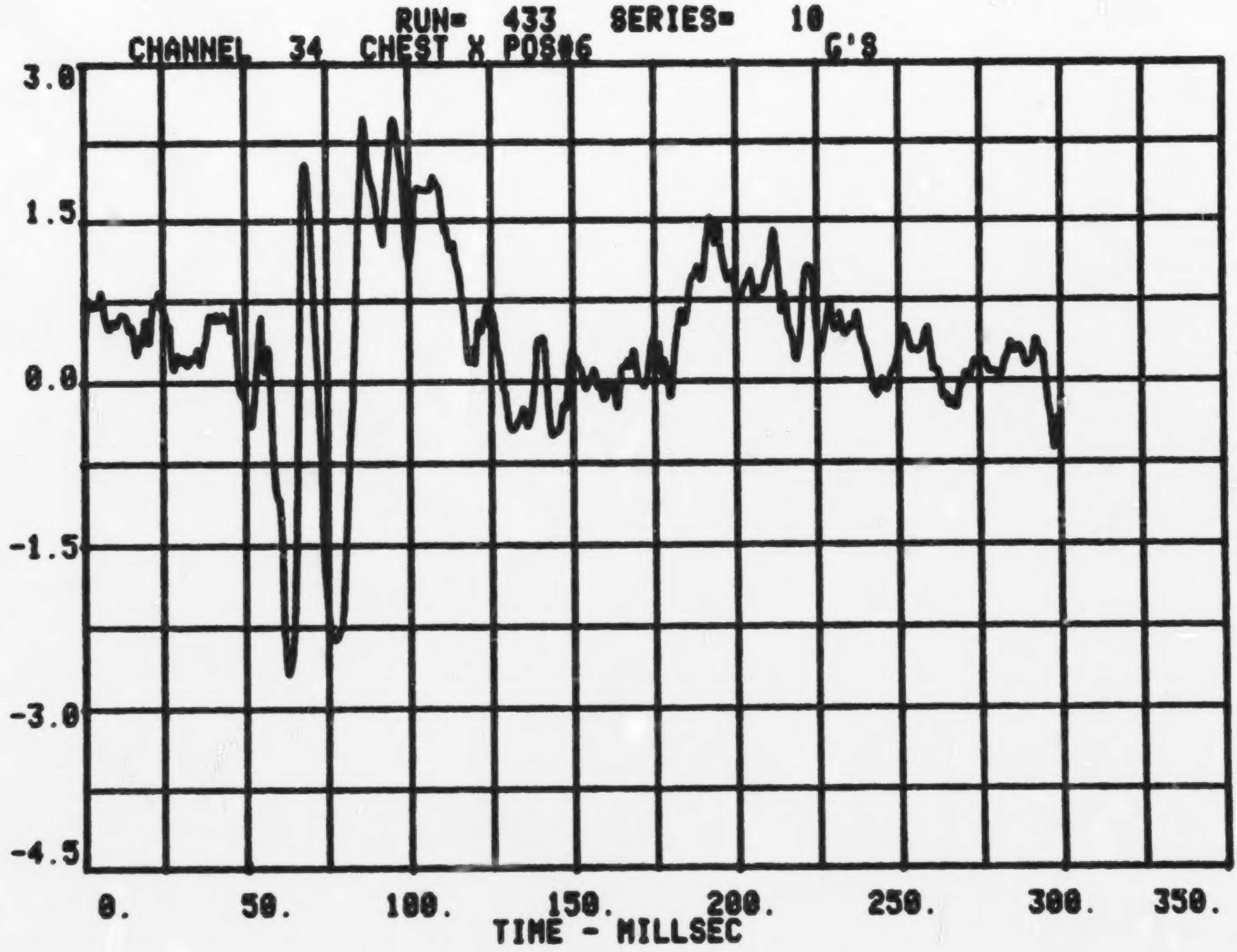
6440-V-6


RUN= 433 SERIES= 10
CHANNEL 11 HEAD RESULTANT (6)
50.
40.
30.
20.
10.
0.
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

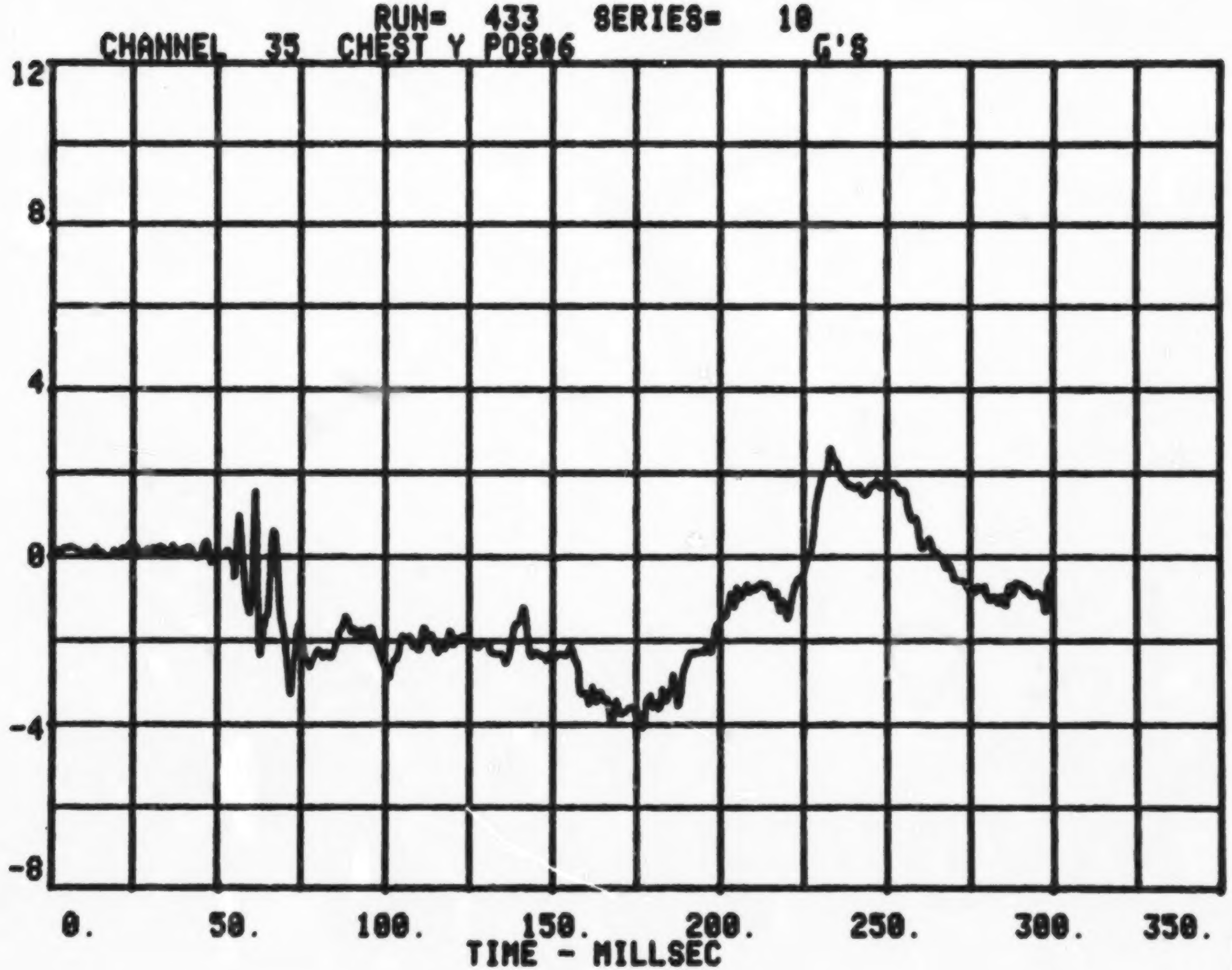
829

6440-V-6

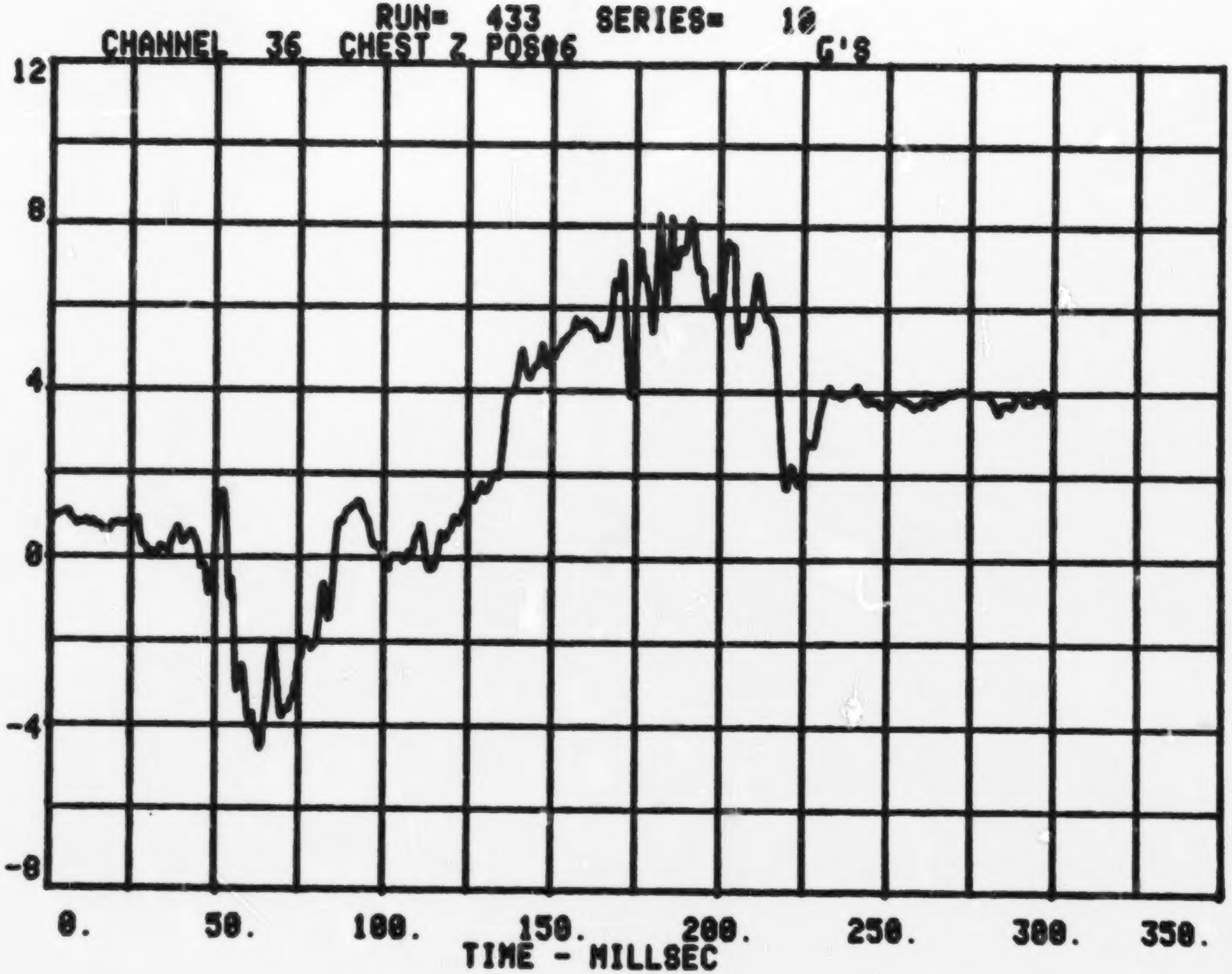
830


RUN= 433 SERIES= 10
CHANNEL 34 CHEST X POS#6
G'S
3.0
1.5
0.0
-1.5
-3.0
-4.5
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

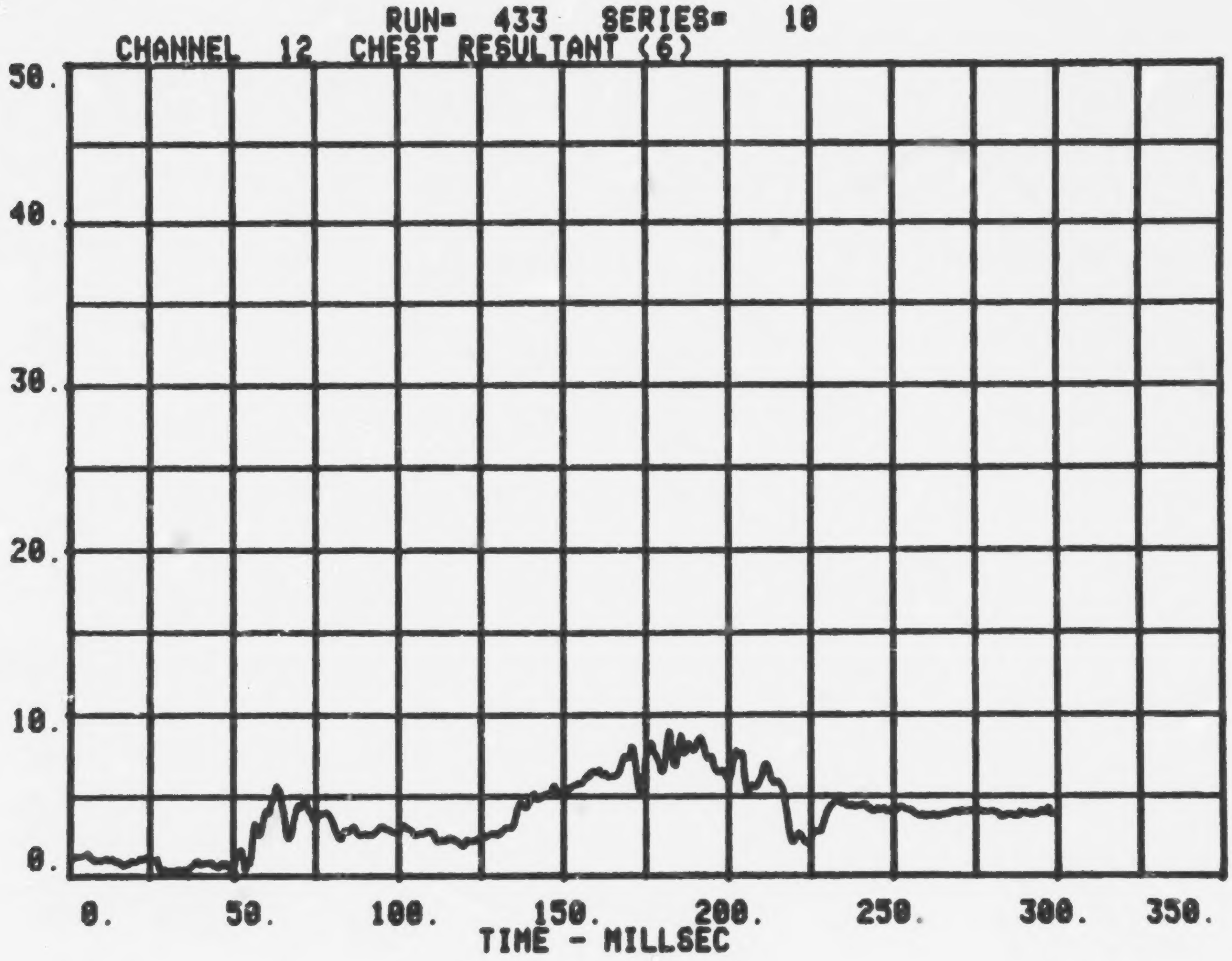
6440-V-6


RUN= 433 SERIES= 10
CHANNEL 35 CHEST Y POS#6 G'S
12
8
4
0
-4
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

832

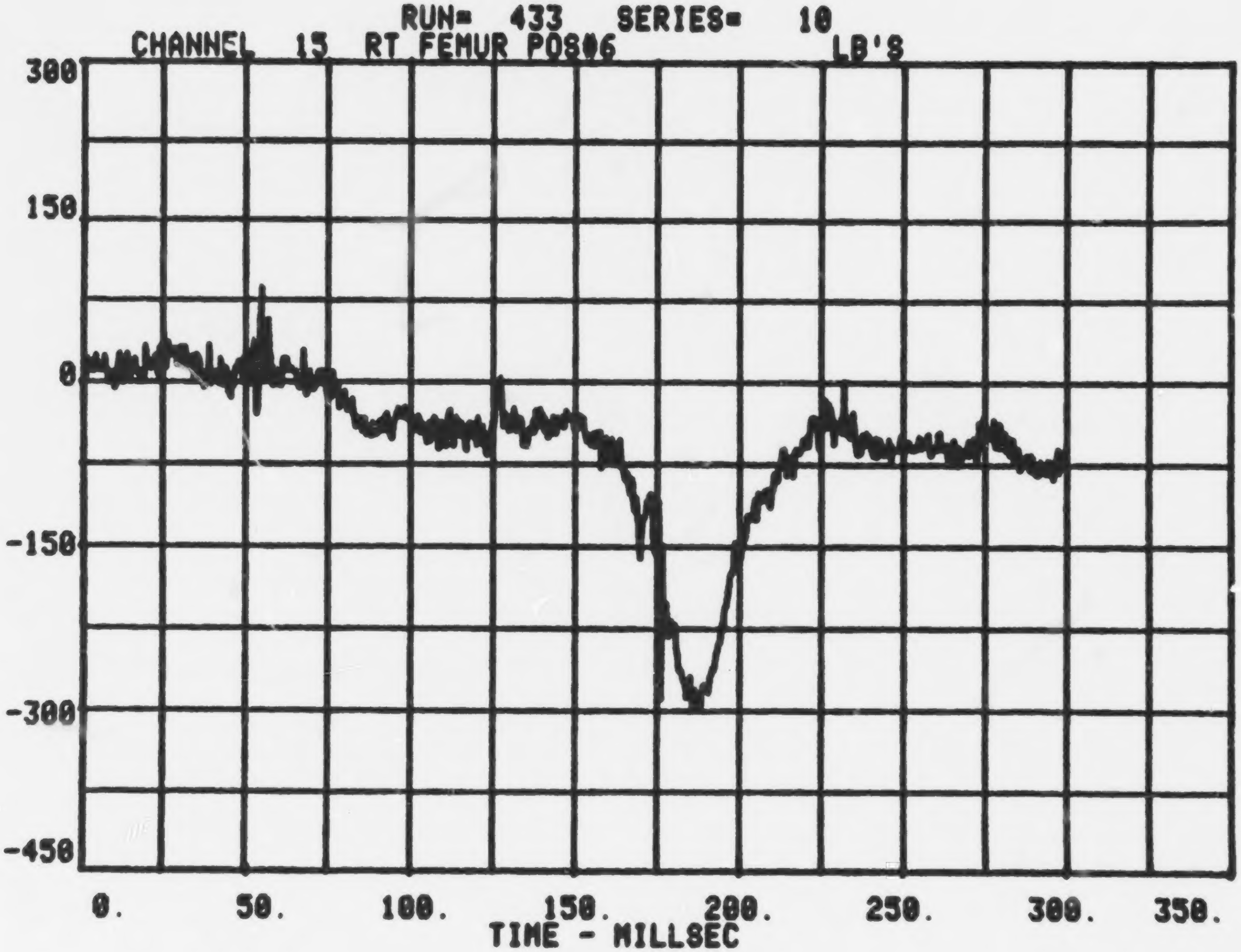

RUN= 433 SERIES= 10
CHANNEL 36 CHEST Z POS#6
G'S
12
8
4
0
-4
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

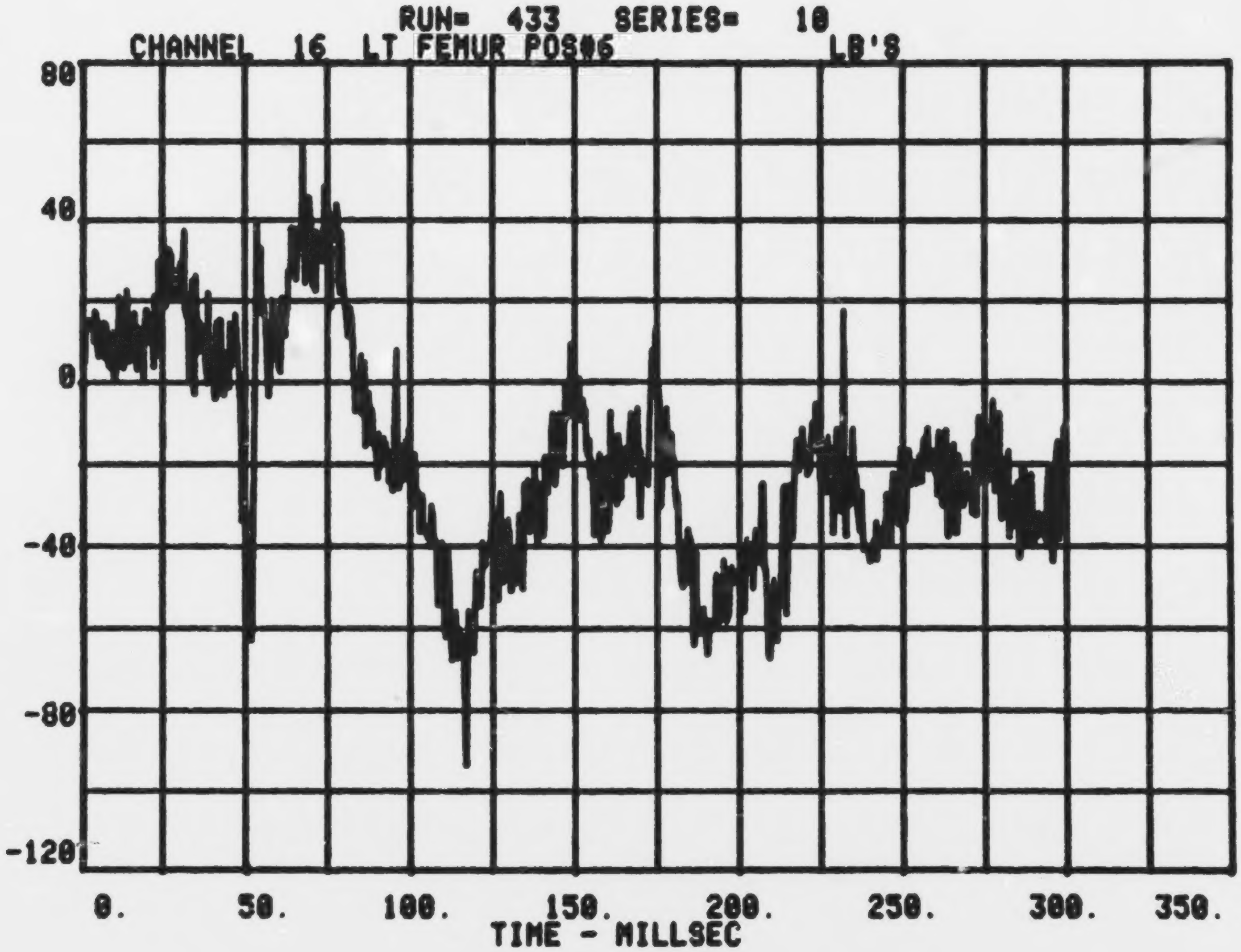

RUN= 433 SERIES= 10
CHANNEL 12 CHEST RESULTANT (6)
50.
40.
30.
20.
10.
0.
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

834

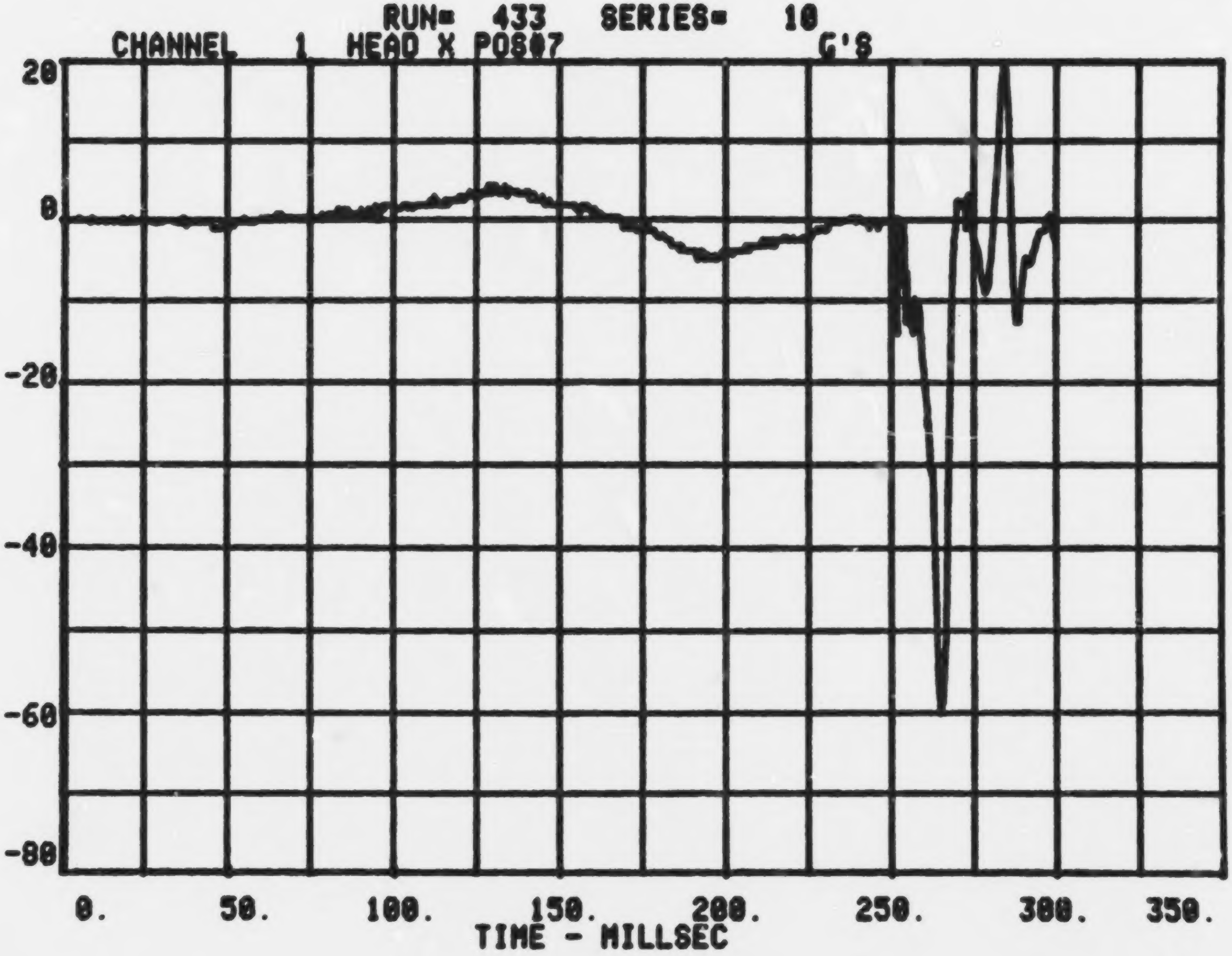

RUN= 433 SERIES= 10
CHANNEL 15 RT FEMUR POS#6
LB'S
300
150
0
-150
-300
-450
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6


RUN= 433 SERIES= 10
CHANNEL 16 LT FEMUR POS#6
LB'S
80
40
0
-40
-80
-120
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

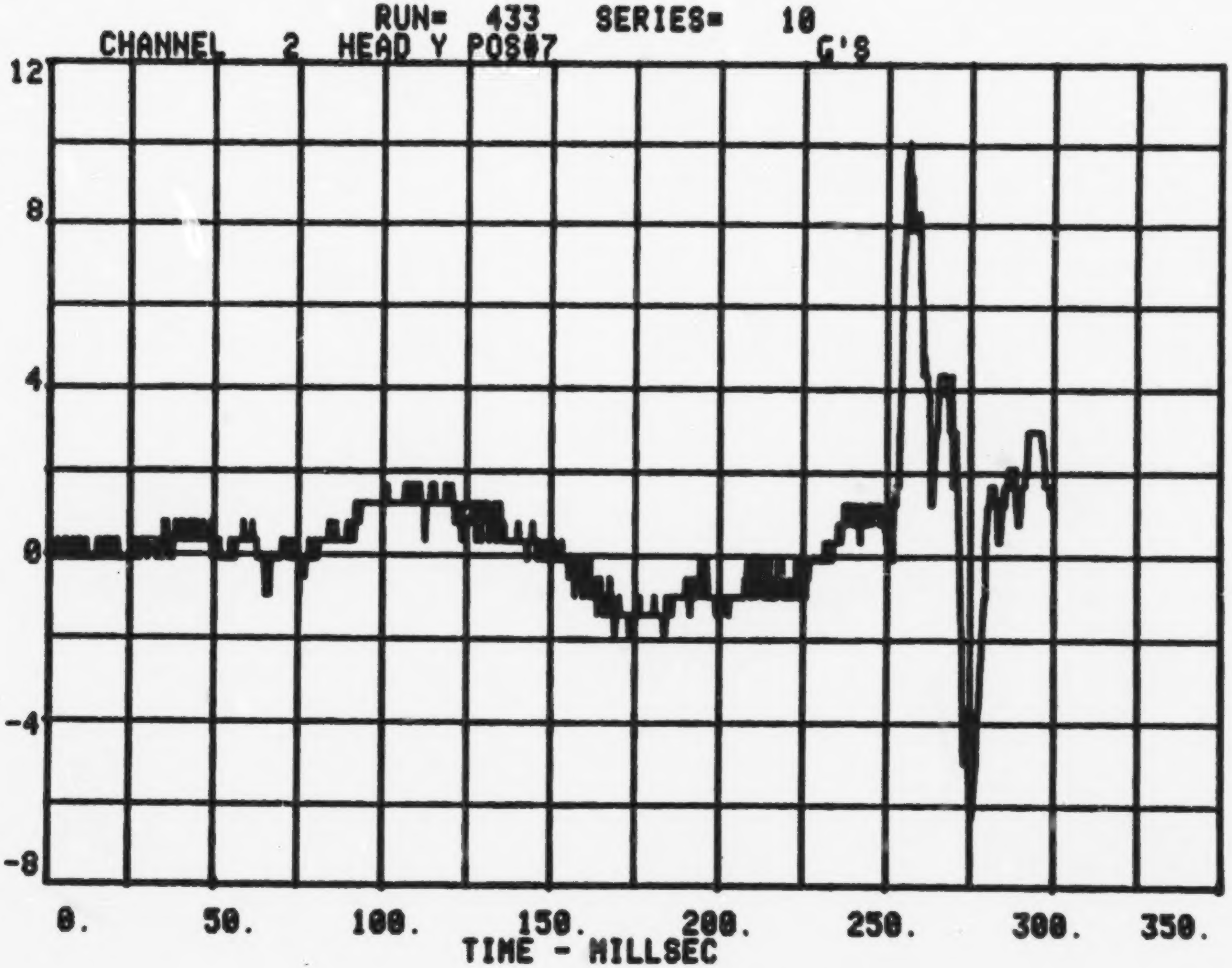
```
HEAD INJURY CRITERION
HEAD SEVERITY INDEX

BUS TEST

RUN= 433

HEAD RESULTANT (7)

HIC=  95.3   FROM T1= .26190   TO T2= .26760

AVERAGE ACCELERATION BETWEEN T1 AND T2=  48.9G'S

EVENT TIME= 300.0  MSEC

SEVERITY INDEX= 154.1
```


RUN= 433 SERIES= 10
CHANNEL 1 HEAD X POS07 G'S
20
0
-20
-40
-60
-80
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

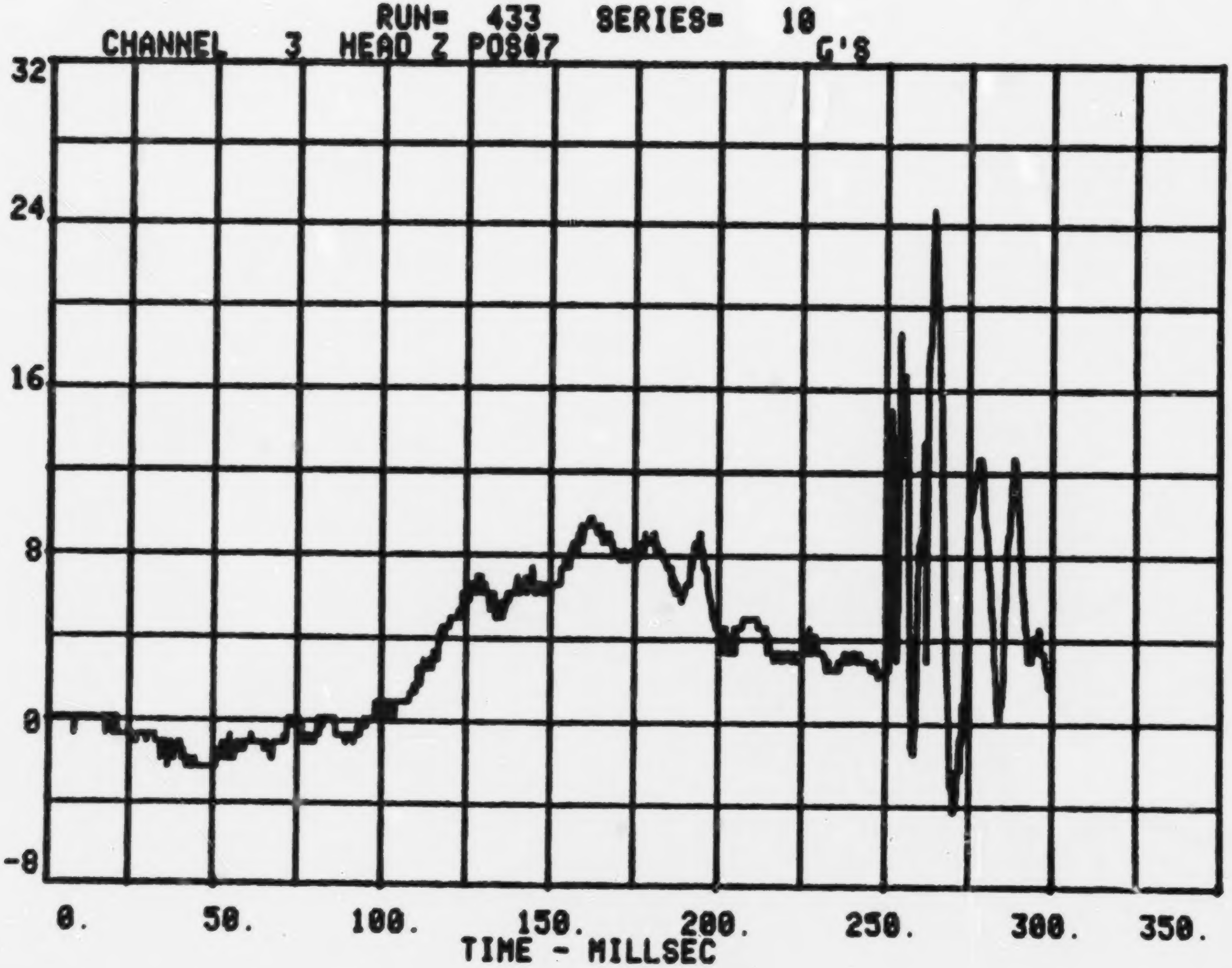
6440-V-6

837

838

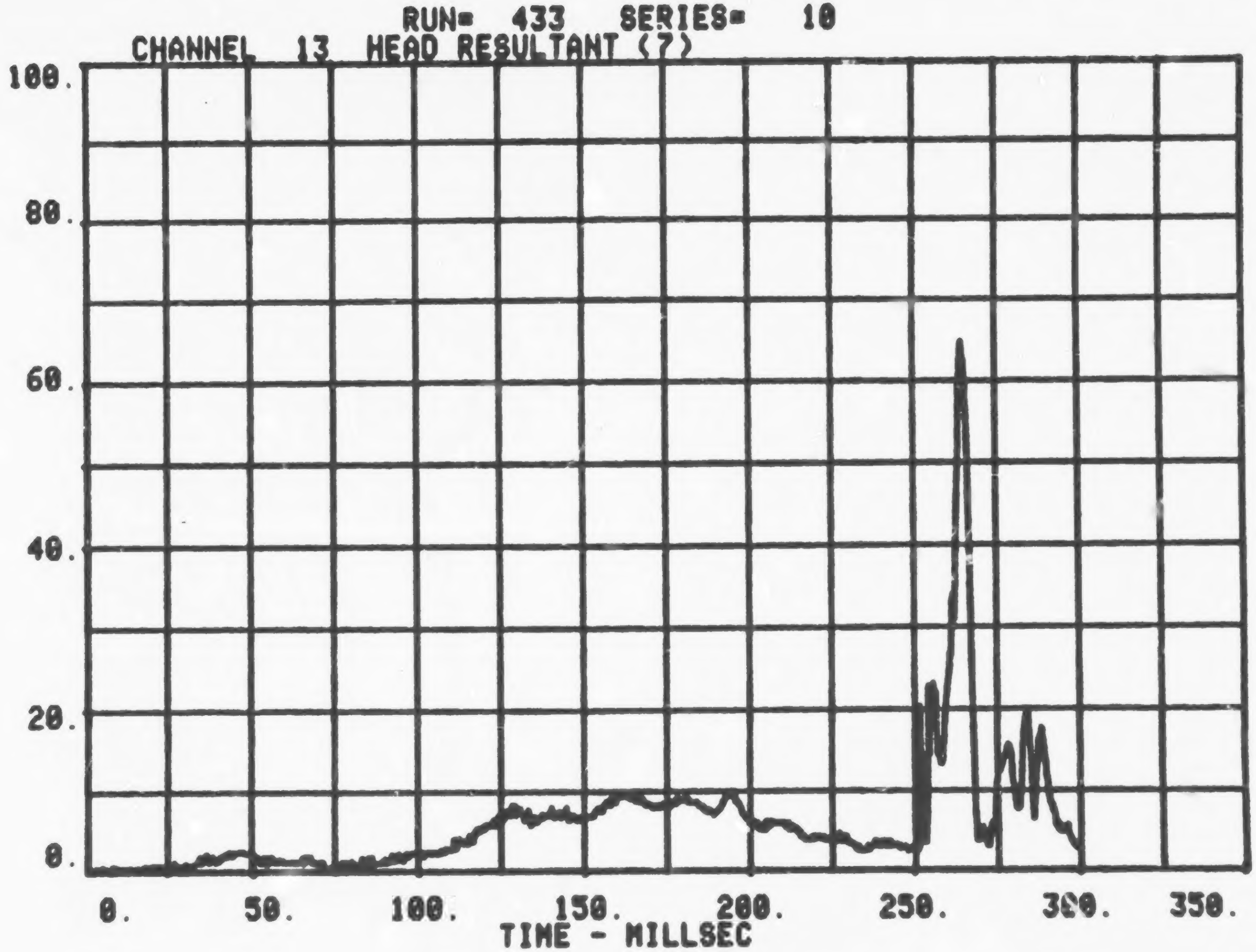

RUN= 433 SERIES= 10
CHANNEL 2 HEAD Y POS07
G'S
12
8
4
0
-4
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

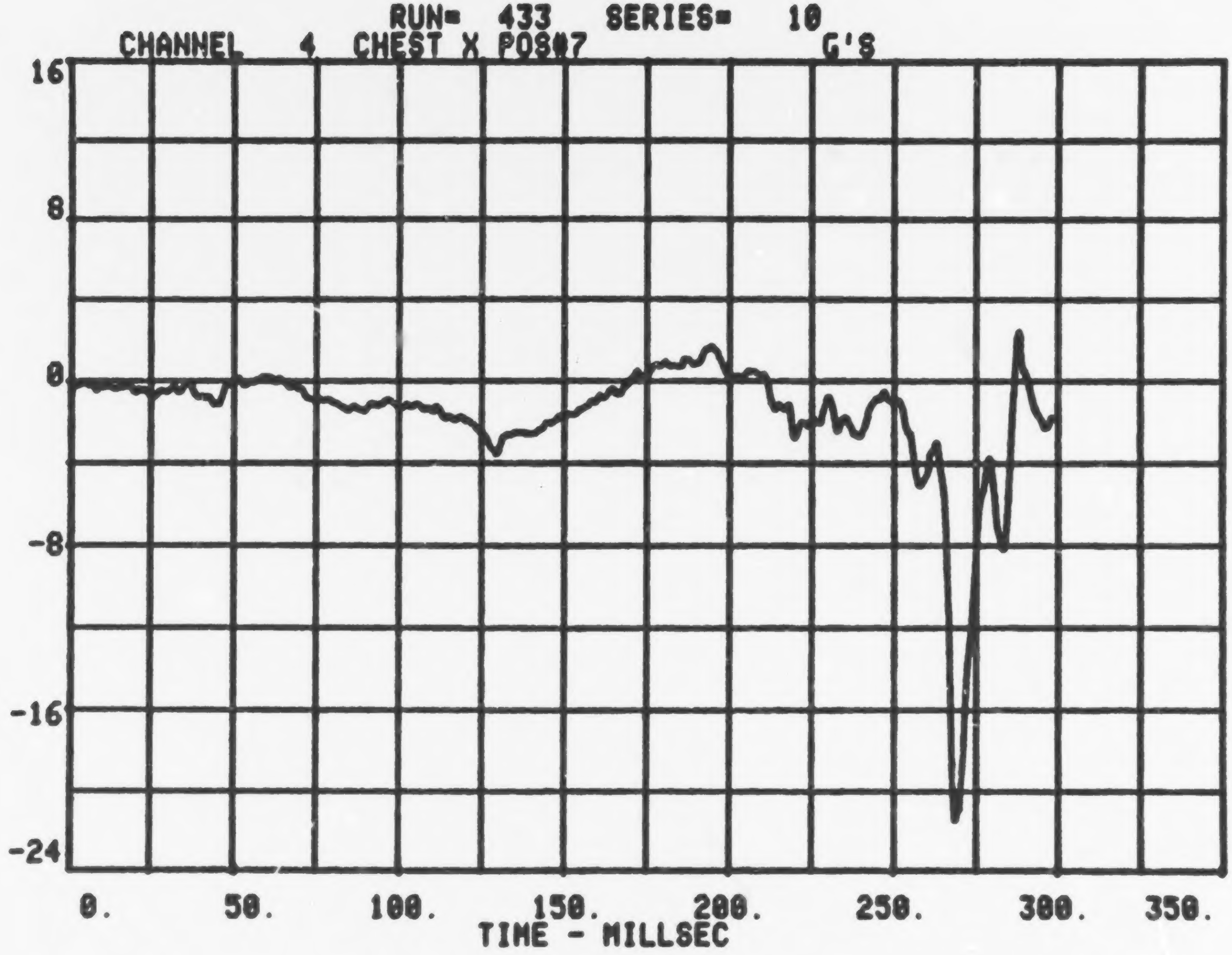

RUN= 433 SERIES= 10
CHANNEL 3 HEAD Z P0807
G'S
32
24
16
8
0
-8
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

840


RUN= 433 SERIES= 10
CHANNEL 13 HEAD RESULTANT (7)
100.
80.
60.
40.
20.
0.
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

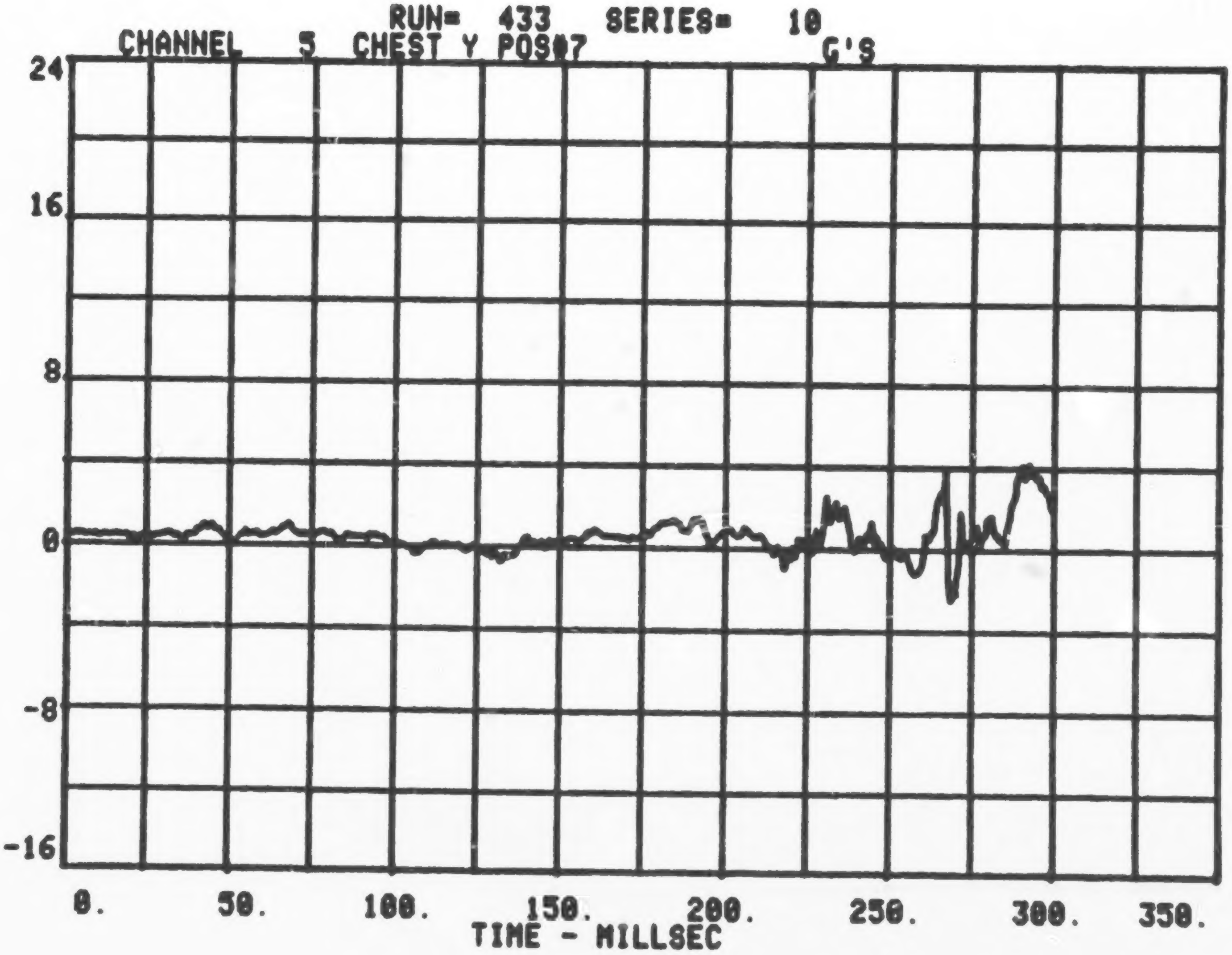
6440-V-6


RUN= 433 SERIES= 10
CHANNEL 4 CHEST X POS#7
G'S
16
8
0
-8
-16
-24
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

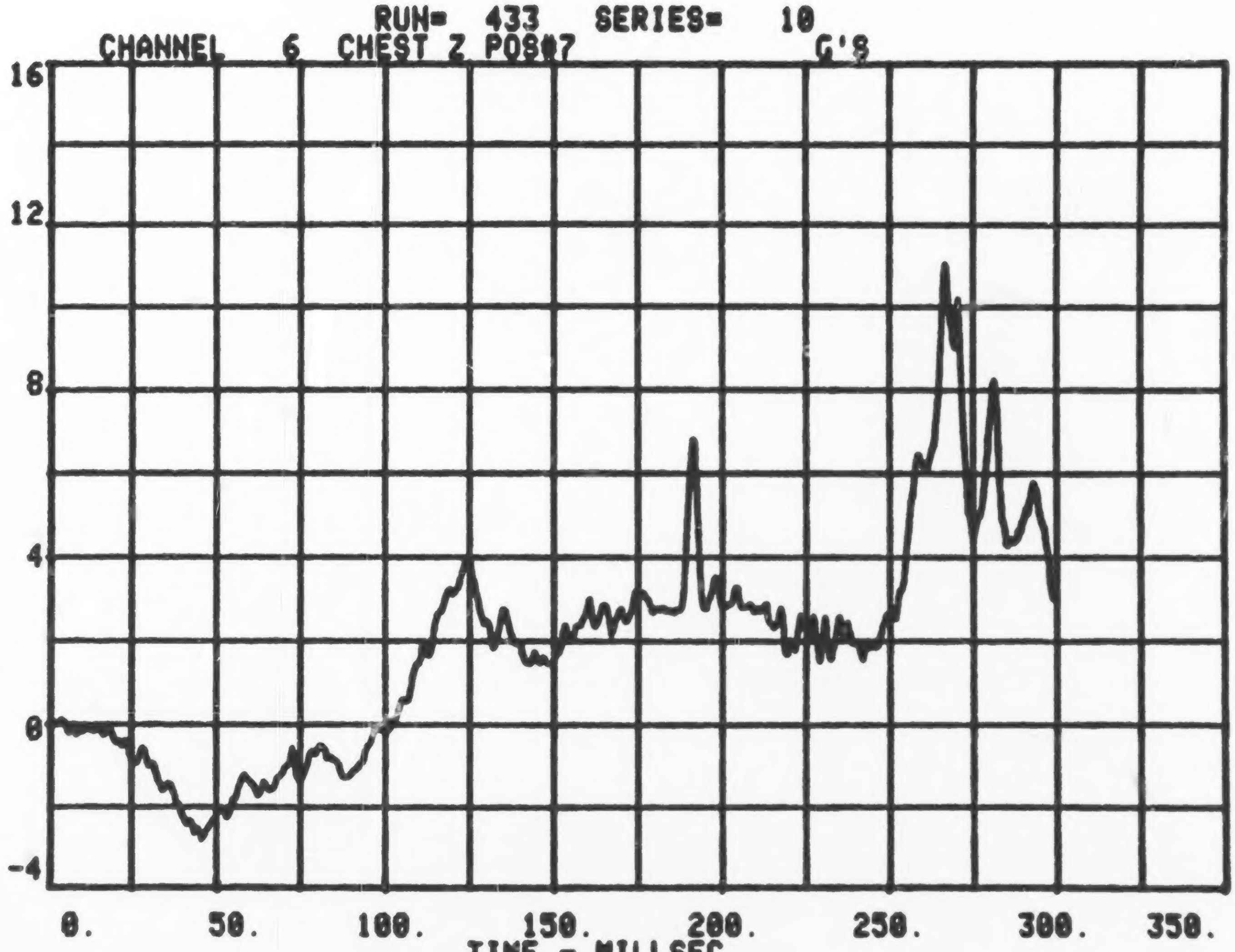
6440-V-6

841

842


RUN= 433 SERIES= 10
CHANNEL 5 CHEST Y POS#7 G'S
24
16
8
0
-8
-16
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

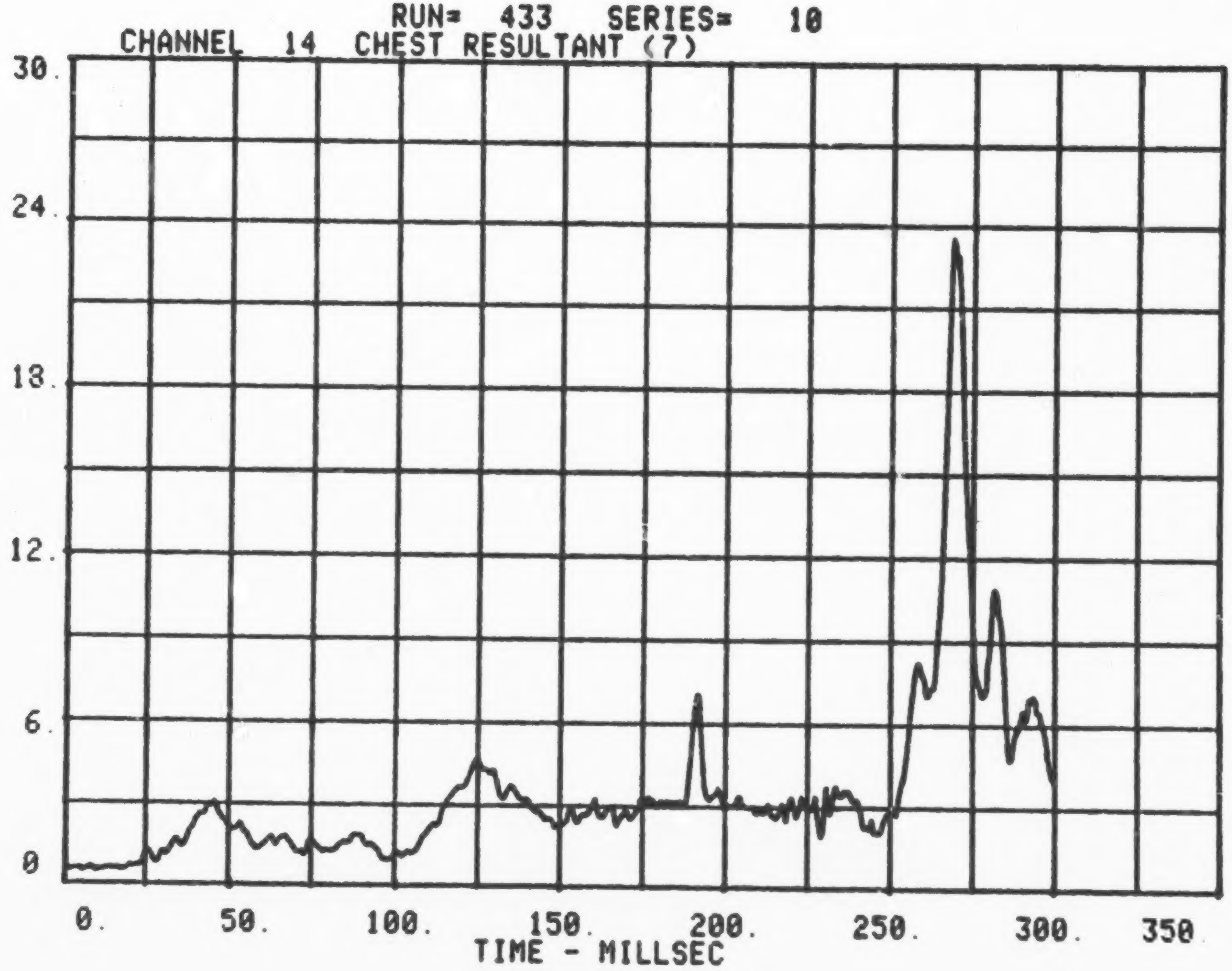
6440-V-6


RUN= 433 SERIES= 10
CHANNEL 6 CHEST Z POS#7 G'S
16
12
8
4
0
-4
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

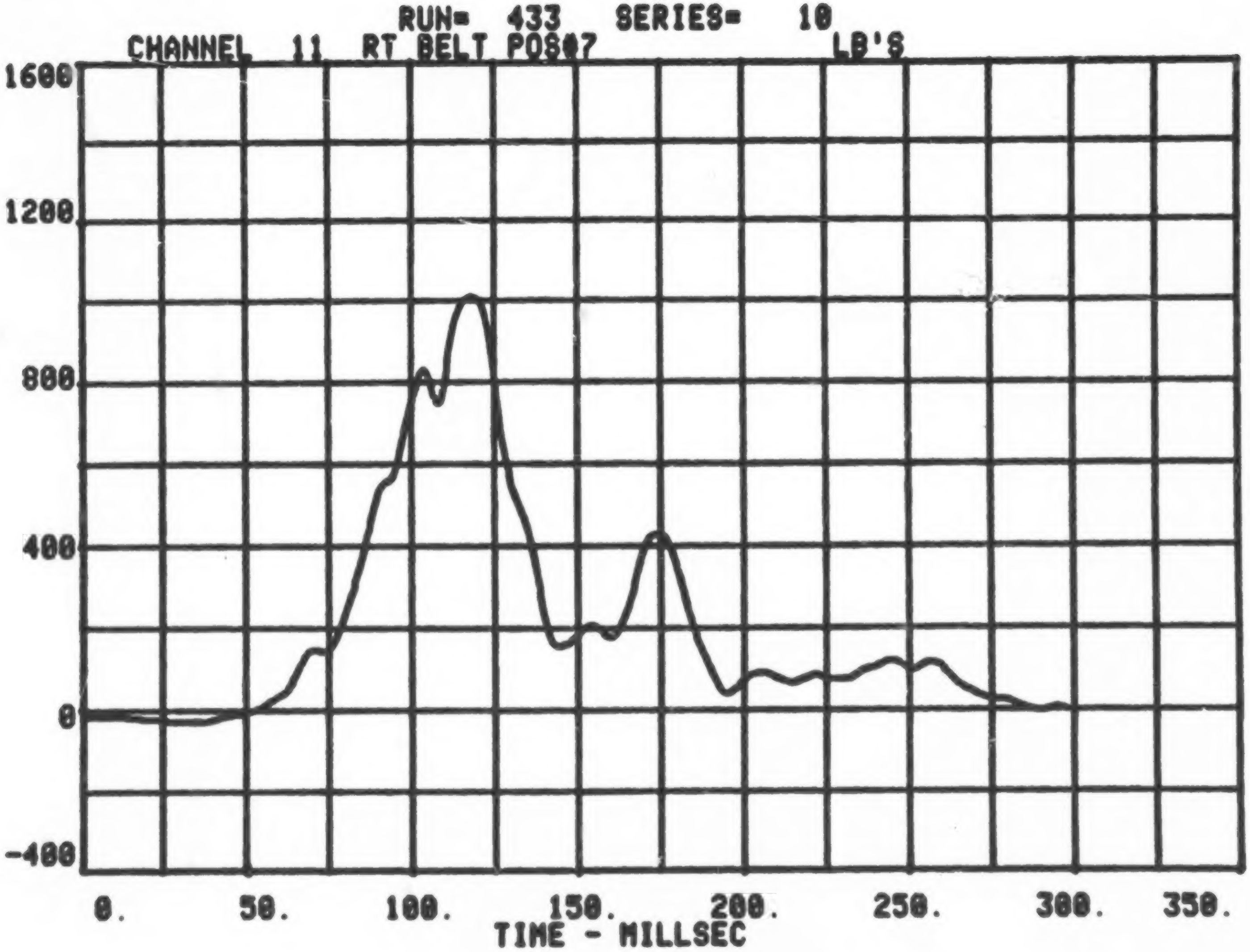
6440-V-6

843

844


RUN= 433 SERIES= 10
CHANNEL 14 CHEST RESULTANT (7)
30.
24.
18.
12.
6.
0
0.
50.
100.
150.
200.
250.
300.
350
TIME - MILLSEC

6440-V-6

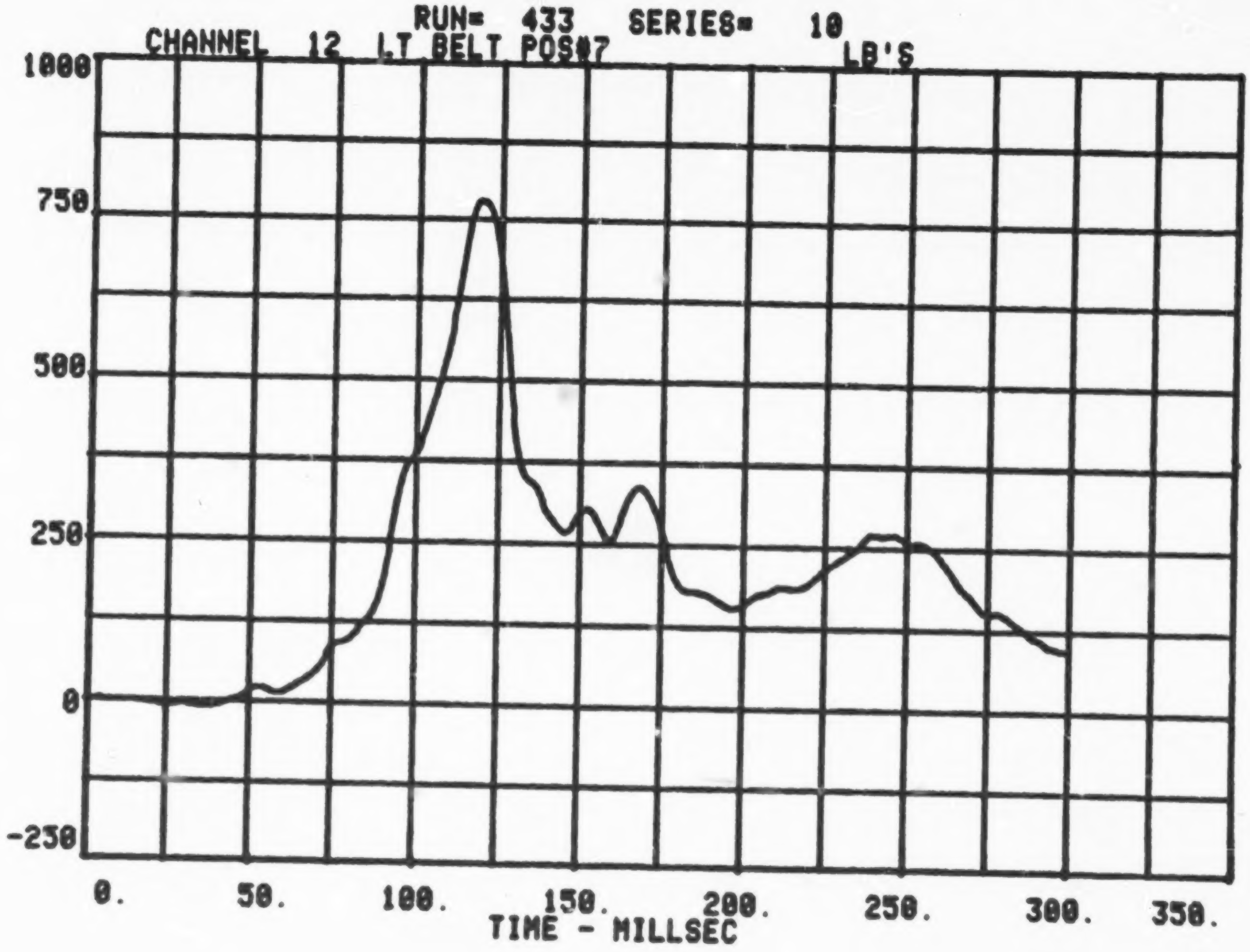

RUN= 433 SERIES= 10
CHANNEL 11 RT BELT POS#7
LB'S
1600
1200
800
400
0
-400
0.
50.
100.
150.
200.
250.
300.
350.
TIME - MILLSEC

6440-V-6

845

846

*U.S.GOVERNMENT PRINTING OFFICE: 1981 341-428/1323



RUN= 433 SERIES= 10
CHANNEL 12 LT BELT POS#7 LB'S

6440-V-6